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The Rôle of Activated Milk in the Anti-Rickets Campaign*

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IN endeavors to protect the community from disease our usual concern is to have at our command a specific agent or some preventive method which is effective. In regard to rickets quite the contrary holds true. In this disorder we are burdened with such a multiplicity of preventive agents that we find ourselves at a loss to decide which one to select. We have at our disposal direct irradiation with ultraviolet rays, cod liver oil or its concentrates, viosterol, activated milk, and still others. This is by far the greatest array of specifics which can be marshalled against any disease. In the course of the past few years, however, the problem has become simplified for it is increasingly evident that, from a communal standpoint, the best method of preventing rickets involves the use of some form of antirachitic milk and, furthermore, that we must draw a distinction between measures which are most suitable for the prevention and those most suitable for the cure of rickets. As has been emphasized elsewhere, there are two reasons why an activated milk should be singled out for prophylactic use; first and mainly because it provides a therapeutic measure which is automatic, in that the specific agent is embodied in the food which is essential for the nutrition of the infant. In addition, milk has the distinction and advantage of being the food which contains calcium and phosphorus in highest degree.

It is now over 7 years since I reported experiments showing that

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milk can be activated by means of exposure to ultra-violet energy.[1] However, although milk of this kind has been used on a considerable scale in a few cities in Europe, notably Frankfurt, Germany, it has not been used commercially in this country, except in the form of irradiated dry milk. As you know, instead of elaborating an antirachitic milk by means of direct irradiation this end may be accomplished by means of feeding cows activated yeast. Furthermore, milk may be given antirachitic properties by mixing irradiated ergosterol with it, as has recently been shown by Laquer,[2] or by adding a concentrate of cod liver oil. However, these two methods, whatever advantages or disadvantages they may prove to entail, cannot be considered at the present time as neither of these types of milk has been subjected to extensive clinical test, which after all is imperative in all questions involving human nutrition.

As reported a year or more ago, the milk of cows which are receiving large quantities of irradiated yeast develops high antirachitic potency and may be recommended to protect infants from rickets.[3] This measure is being used to an increasing extent on numerous farms, mostly of the certified variety, in various sections of the United States. It is a procedure that is applicable especially to the certified farm, where the ration of the cows can be thoroughly controlled and one can be certain that a potent yeast is fed in adequate amount, and more particularly, where frequent biologic assays of the milk can be carried out. It would seem, however, that it is hardly applicable for the general supply of large communities, especially for great cities which require many thousands of farms to meet their demands. For this purpose irradiation has an inherent advantage, in that the milk can be activated at a central station, perhaps at the same time that it is subjected to pasteurization.

I shall not enter into a consideration of the technic of activation as this aspect has been considered recently in several communications.[4] It is sufficient to say that milk can be rendered highly antirachitic by subjection, for a period of merely 16 seconds, to the radiations of certain carbon arc rays, and that in the course of this process it does not develop any disagreeable taste or odor nor is it deprived of its essential vitamins. If we would obtain a product which is reliable and constant, it is necessary, as emphasized in an investigation with Supplee and Dorcas, to carry out the irradiation under fully controlled conditions.[5]

In a clinical test carried out during two winters in baby health clinics of the Department of Health in New York, it was established unequivocally that such irradiated milk is able to prevent rickets

almost without exception. Indeed, it prevented the development of this disorder in negro infants who are exceptionally susceptible. It should be added that the majority of these infants were under 6 months of age and received three-quarters rather than an entire quart of milk daily. Biologic assays of this milk showed that it did not vary to a great extent in vitamin D content. In general it may be stated that the variation of vitamin concentration in foods, not only of the antirachitic factor, but of other vitamins as well, has been stressed far too greatly. It should be remembered that nature supplies us with vitamins quite irregularly and that her quota is by no means rigid. For example, nothing could be more variable than our daily quota of the antirachitic factor. This varies in amount according to exposure to sunlight, to whether the day is clear or cloudy, whether we are out of doors much or little or expose our bodies to a greater or less extent and, particularly, according to season and to whether we live in the North or in the sunny South.

There is another point which I wish to emphasize—the clinical distinction which has been found to hold true in regard to the potency of various antirachitic agents. It is the established custom to refer to an antirachitic agent such as viosterol, cod liver oil, or irradiated milk, as possessing a certain number of antirachitic units per c.c. or per quart. Indeed, it has been accepted that the potency of one preparation may be expressed in terms of another, for example, that the strength of viosterol may be stated in terms of cod liver oil. In 1930, we reported clinical observations which showed that this assumption, based on assays on rats, does not accord with clinical experience, in that much more viosterol was needed to protect infants than should be expected or required, as judged by bioassays of the two antirachitic agents.[6] In 1931 a similar discrepancy was pointed out in connection with a comparative clinical test of viosterol with "yeast milk" and with irradiated milk.[3] The preventive dose of these three antirachitic agents is approximately 24 ounces of yeast milk, 3 teaspoonfuls of cod liver oil, or 10 drops of viosterol. Translated into terms of rat units this means that 120, 200, and 800 units are required, respectively, as a daily prophylactic dose. This inequality, from the laboratory point of view, was quite unexpected. The problem was emphasized still further when it was found that 35 units of irradiated milk, as determined by the standard rat technic, sufficed to protect a large series of infants.

Clinical experiences of this kind are supported by suggestive laboratory observations which have been noted during the past few years. For example, over 2 years ago it was shown that chickens require a far

larger number of antirachitic units when this factor is supplied in the form of viosterol than as cod liver oil.[7] These observations have been substantiated and extended from various sources. In view of various considerations of this nature I suggested at Stockholm in 1930 that " it is possible that in addition to vitamin A, cod liver oil contains something which is of value in rickets and which is not present in irradiated ergosterol." [8]

Observations on cows have led to the discovery of similar discrepancies. It was found that about three times as much irradiated ergosterol as of activated yeast had to be incorporated in the daily ration in order to procure approximately 160 units of antirachitic vitamin in a quart of milk. Recently, Krauss and his colleagues reported a similar lack of uniformity, from the point of view of unitage, in the therapeutic activity of butter fat and of cod liver oil.[9] Without going into further detail, it would seem, as a result of these clinical and laboratory experiences, that we should not generalize in regard to the potency of the various antirachitic agents, but that we must be guided by the clinical activity which each is found to possess. Furthermore, one preparation should not be compared to another, for example, activated milk with viosterol, or viosterol with cod liver oil. It is permissible merely to draw a comparison between various preparations of the same kind, of viosterol to viosterol, of cod liver oil to cod liver oil. Such being the case, it is evident and should be clearly understood that the new " international unit " for vitamin D which allows a solution of irradiated ergosterol or of cod liver oil of known antirachitic potency to be used as " the standard of reference " does not imply that, from a clinical point of view, these two agents are equivalent.

Activated milk, in the fluid or dry form, possesses the advantage not only of providing an automatic method of preventing rickets and of supplying this essential factor in a medium rich in phosphorus and calcium, but, as has been shown, it accomplishes this end by means of an exceptionally small amount of the antirachitic factor. In view of these important advantages I do not hesitate to recommend the general use of such milk for infants and children, especially in large communities. Whether adults, whose bones are growing at a much slower rate, require a supplement of vitamin D to their dietary must be left undecided, to be answered according to the outcome of subsequent investigation. There can be little doubt, however, that the rapidly growing organism requires this factor and that, in the temperate zones, the infant and child do not receive the optimal amount from the radiations of the sun and from the meager supply in the food.

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NOTE: Such experiences with antirachitic agents make one wonder whether similar discrepancies may not exist in the realm of other vitamins; for example, whether carotin exerts the same activity clinically as an equivalent number of vitamin A units of cod liver oil, butter, vegetables, etc.

Prevention and Cure

". . . A rational distinction may be drawn, and even a logical contrast set out, between medical activities primarily put into operation in the interests of the individual—or medical practice which is mainly clinical—and those principally directed to the well-being of a community; but this is very far from establishing an antithesis between prevention and cure.

When legitimate distinctions are intended they should be exactly and accurately stated, and it is time tha tthe false contrast should not only be discouraged both in medical and in popular writings and speeches, but ended. . . ."

In this address Sir George Newman shows, with his usual charm of style and his usual abundance of illustration and example, that during the past hundred years almost all the great advances in what is called preventive medicine have been made possible and actually brought about by private practitioners, and mainly in the course of their ordinary clinical work. There have been some great sanitarians and some famous laboratory workers in this field who were laymen, but in the fascinating story of modern preventive medicine "there is nothing more significant or more illuminating than the constructive service which has been rendered by medical practitioners. It is they who have made the bricks, found the road, explored the facts, carried on the fight, and educated the people in a way of life. . . . The medical man is an individualist and he is educated by an inductive method. All unconsciously, without losing his individualism and by way of induction, he has been the builder of State medicine and has opened wide the gates of prevention." The exuberance of metaphor merely emphasizes the importance of the achievement. "In every branch of medicine and in every county of England practitioners have placed their names permanently upon a roll of fame as preventive benefactors and explorers."—Editorial, *Brit. M. J.*, July 30, 1932, pp. 209–210.

Protective Value for Infants of Various Types of Vitamin D Fortified Milk

A Preliminary Report

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THE multiplicity of antirachitic agents available at the present time has resulted naturally in efforts by both laboratory and clinical workers to determine their relative values. The biological assays of these various agents have made available data concerning their potency in units of vitamin D. But we would emphasize the fact that biological assays on animals have overshadowed the clinical data obtained upon human infants, and that the clinical value of a given antirachitic agent does not necessarily parallel its potency in terms of rat units.

Hess and Lewis [1] have recently pointed out the fallacy of estimating necessary human dosage of different antirachitic agents purely on the basis of rat assays. They have also shown that the greatest discrepancy arises when vitamin D fortified milk is compared with other antirachitic agents.

This study is concerned with the determination of the antirachitic potency of various types of vitamin D fortified milks; using in parallel series groups of human infants and rats. This preliminary report deals with three types of milk:

Milk irradiated with the carbon arc lamp
Milk from cows fed irradiated yeast or "yeast milk"
Milk from cows irradiated with the carbon arc lamp

We are especially interested in the last named product because of the lack of clinical studies of its efficacy and because of the recent

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development for practical purposes of the more powerful carbon arc lamps.

Previous studies of great value have been reported upon irradiated milk. Hess and Lewis,[1] in the study mentioned, reported the units of vitamin D in fluid milk irradiated with the carbon arc lamp, together with the prevention and treatment of rickets in human infants by means of this milk. They found that less than a quart of such milk would protect infants from rickets despite the fact that it contained "only 50 units of vitamin D as assayed by the standard rat technic." However they do not mention how much less than a quart of this milk will protect infants from rickets. Hess, Supplee,[2] and their coworkers had published studies upon the number of units of vitamin D in dried milk, irradiated with carbon arc lamps, previous to drying. Their results with dried milk were entirely in accord with the results of their studies upon fluid milk. Many other valuable studies have been made upon the direct irradiation of milk, among which those of Watson,[3] and Cowell,[4] in England, Scheer,[5] in Germany, Wieland,[6] in Switzerland, and Kramer,[7] in the United States, should be mentioned. The clinical data available, however, upon the amount of irradiated milk necessary to protect human infants from rickets are inconclusive.

Since the results of our studies upon both infants and rats fed irradiated milk agree quite closely with Hess's and Lewis's results obtained at about the same time and with the same type of carbon arc lamp, we prefer for the present discussion to summarize them in a very few words.

In our studies of irradiated milk as in the other studies, two widely separated rat colonies were used with protective and curative experiments proceeding at the same time in both colonies. The standard methods of rat assay were used with the exception that varying amounts of 50 per cent cream were fed to the rats in place of whole milk or butterfat, as used by most workers. The object of using 50 per cent cream was to insure a somewhat more normal intake of salts than the usual rat assay includes. Since we could find little data upon the antirachitic potency of irradiated skimmed milk, we fed it in varying quantities to different groups of rats. From the results of these studies we concluded, as expected, that the antirachitic power of the irradiated whole milk lies almost entirely in the butterfat, since even large quantities of skimmed milk had little effect in either protective or curative experiments.

The method of irradiation was practically identical with that used by Supplee, Hess, and Lewis, and we are indebted to Dr. Supplee for his assistance in the arrangements. The milk was passed twice in

a thin film (approximately 0.4 cm.) over a wash board cooler in a large pasteurizing plant, and was exposed for 16 seconds to a carbon arc lamp in such a way that each c.c. of milk received a total of about 2½ million ergs, between 2,000 and 3,000 Angström units.

In this study the mixed pasteurized milk used for a control experiment contained on the average, 6 units of vitamin D per quart. The irradiated milk fed as 50 per cent cream to rats in the two separate colonies, in both preventive and curative experiments, contained on the average 65 units of vitamin D per quart of milk; an amount slightly higher than that found by Hess and Lewis. Throughout the present studies we have used the Steenbock unit for vitamin D in recording the rat assays.

The clinical studies were made upon infants resident in St. Vincent's Hospital, a large foundling home. Those chosen ranged between birth and 6 months of age at the time of starting the experiment. They remained constantly in a ward where it was not possible for direct sunlight to reach them, and where any possible effect of skyshine was excluded by glass and screening. For 2 hours each day, however, during 3 summer months they were placed in a low roofed, screened pavilion, which was so placed with reference to surrounding buildings that no direct sun whatever touched it and skyshine was also excluded. All antirachitic agents were withdrawn 6 weeks before commencing the experiments, which to date have continued for a period varying between 6 and 8 months, beginning from February to April, and continuing to the following October. We have planned to continue the experiments for the full circle of a year.

Physical and X-ray examinations were made at the beginning of the period and repeated monthly. The clinical criteria used in estimating the presence of rickets were those suggested by Hess. The most critical interpretation was placed upon the X-ray readings. It was not possible to obtain blood calcium and phosphorus determinations. A small control group with no antirachitic agents was started but unfortunately most of these babies were discharged too soon to be counted in the study. Formulae were left unaltered so that the group receiving the test milk might be comparable to those remaining on other antirachitic agents.

In Table I are shown the results at the beginning of the test period, and 6 to 8 months later clinical and X-ray diagnoses were made separately; one examiner having no knowledge of the other's findings. For the purpose of saving time and space the intermediate examinations are not recorded here. Clinically no child ever showed evidences

TABLE I

INFANTS TREATED WITH IRRADIATED MILK

Number of cases showing rickets clinically and by X-ray

	At time of starting milk					After 6-8 months on irradiated milk							
Clinical evidence		X-ray evidence				Clinical evidence				X-ray evidence			
		None	Mild	Moderate	Active	None	Mild	Moderate	Active	None	Mild Healed	Moderate Healed	Active
None	8	8	0	0	0	8	0	0	0	6	1	1	0
Mild	3	3	0	0	0	2	1	0	0	3	0	0	0
Moderate	2	2	0	0	0	2	0	0	0	1	1	0	0
Active	0	0	0	0	0	0	0	0	0	0	0	0	0

of rickets greater than that frequently seen in children in private practice on what is considered adequate antirachitic therapy with cod liver oil or viosterol. By X-ray examination no persistent active rickets whatever was found. We recognize of course that the last readings here reported were made in October and for final estimation the work is to be continued through the ensuing winter.

The infants grew satisfactorily and a distinct general impression was gained by an independent observer that their physical condition was superior to that of the infants on cod liver oil.

Owing to the loss of the small control group it is not possible to show the presence of rickets among an identical group. It is obvious, however, that under the given conditions rickets will develop unless adequate antirachitic therapy is resorted to. It is customary in the institution to give from ½ to 1 teaspoonful of cod liver oil daily and among the older infants and young children the presence of moderate rickets is seen frequently, and severe rickets occasionally.

A small group of markedly rachitic infants have been treated in the wards of the University and Children's Hospitals with irradiated milk as the only antirachitic agent. Prompt healing has occurred in each instance.

We are continuing such studies both protective and curative with a larger group of infants for the purpose of determining more accurately if possible the interrelationship of the human factor and the antirachitic factor particularly as to the quantitative relationship of the antirachitic factor in milk.

In connection with the direct irradiation of fluid whole milk we are carrying on studies with rats concerning the effect of irradiation upon vitamins A and B_1, and with guinea pigs concerning its effect upon vitamin C. As far as we have been able to determine, irradiation with the carbon arc lamp as outlined previously in this paper has no destructive effect upon either vitamin A or vitamin C. Our studies have not yet been completed upon its relation to vitamin B_1.

We are unable as yet to report a protective study upon a group of infants fed upon "yeast milk." Our experience so far with this antirachitic agent has been concerned with rat assays and a few rachitic infants. These confirm the favorable results reported by Hess,[2] and Wyman,[8] and others. The milk used for the rat assays was a commercial "yeast milk" bought on the open market.

The studies concerned with milk from cows irradiated with the carbon arc lamp present the most interesting data. Gowen [9] and his coworkers in 1926 exposed cows for 15 to 30 minutes to ultra-violet rays (type of lamp not mentioned) and reported the cure of rickets in chicks with this milk. Milk from unexposed cows did not cure control chicks. In the same year, Falkenheim [10] and his coworkers reported that milk from cows exposed to a mercury vapor quartz lamp had definite antirachitic power, whereas unexposed control cows produced milk with practically no antirachitic power. Supplee [11] reported that milk produced in summer has greater antirachitic potency than winter milk, and suggested that irradiation of the cow in the sunshine is responsible, but also mentioned that the influence of summer food might be a factor. Steenbock [12] and his coworkers conducted careful studies concerning the effect of irradiation of cows by the sun and by the mercury vapor quartz lamp upon the antirachitic potency of their milk. Their general conclusion was that irradiation of the cow with sun or artificial ultra-violet rays does not affect the vitamin D potency of the milk. In one series of experiments they felt there was a slight increase of vitamin D in the milk. On the other hand, they had reported in previous studies [13] that the antirachitic potency of goat's milk could be increased 24 times by irradiation of the goat with a mercury vapor quartz lamp. Hess [14] has also reported that irradiation of a nursing mother by means of a mercury vapor quartz lamp increased the antirachitic potency of her milk.

In our own studies we have used the carbon arc lamp of the same type as mentioned in the direct irradiation of fluid milk. This lamp differs from the mercury vapor quartz lamp in that it has a continuous spectrum and an intensity many times greater than the mercury lamp. There were 50 cows in the experiment and they had all been fresh

TABLE II

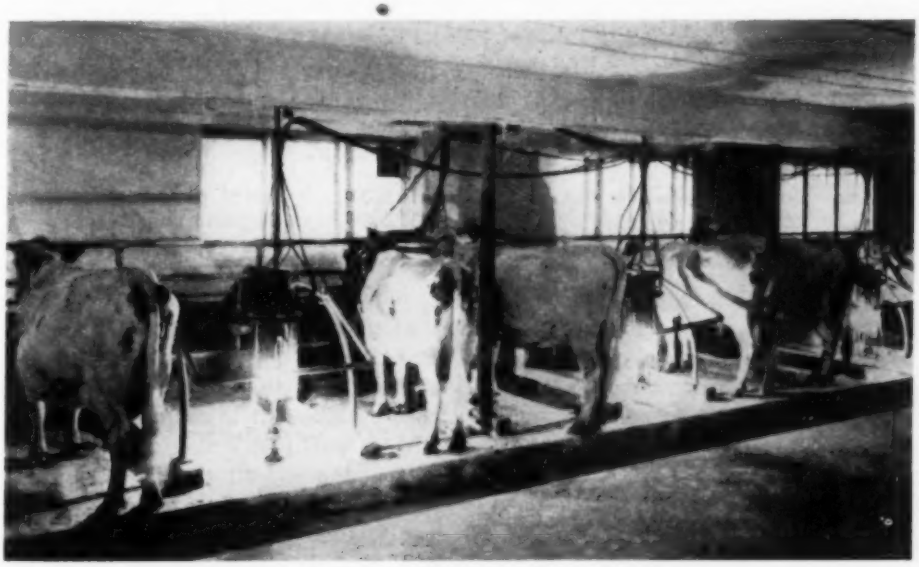
INFANTS TREATED WITH MILK FROM IRRADIATED COWS

Number of cases showing rickets clinically and by X-ray

At time of starting milk						After 6-8 months on the milk							
Clinical evidence		X-ray evidence				Clinical evidence				X-ray evidence			
		None	Mild	Moderate	Active	None	Mild	Moderate	Active	None	Mild Healed	Moderate Healed	Active
None	16	16	0	0	0	15	1	0	0	12	2	2	0
Mild	4	4	0	0	0	2	2	0	0	2	1	1	0
Moderate	1	0	0	1	0	1	0	0	0	0	0	1*	0
Active	0	0	0	0	0	0	0	0	0	0	0	0	0

* With evidence of excess Ca deposit.

from 2 to 6 months. The cows were turned out for 3 hours daily into a shady orchard where there was no grass, and both the experimental group and the control group were fed on 20 per cent grain ration with mixed hay. The experimental group of cows was irradiated for 2 weeks before their milk was used for the studies and the irradiation was continued over the entire 9-month period.



Showing irradiation of cows with carbon arc lamps

The arrangement of the lamps with respect to the cows which were being irradiated is shown in Figure I.

FIGURE I

It will be noted from the diagram that it was possible to irradiate 6 cows at once with this arrangement of stalls and lamps. The stalls were formed by the use of 2″ pipe set into the yoke rack at the front and extruding almost horizontally to the rear where the pipe was bent downward and fixed into the floor. The accompanying photograph illustrates the method of irradiation. The cows could be brought in or taken out without touching or moving the lamps, thereby keeping them in operation continuously and affording a quick and easy method of irradiating a large number of cows in a short period of time.

The lamps were hung so that the arc formed between the two carbons was opposite the under side of the cow's body about midway from front to back. A good exposure of the udder side and the more tender portions on the under side of the body was thus obtained. The

TABLE III

SUMMARY OF UNITS OF VITAMIN D IN MILK PREPARED IN VARIOUS WAYS BY DIFFERENT INVESTIGATORS

Treatment	*Units per Liter Milk*		*Results in Infants*
	Steenbock	*U.S.P.*	
Irradiated ergosterol to cow			
Hess 100,000 units to cow	80	800	Complete protection
200,000 units to cow	160	1,600	Complete protection
Kraus 100,000 units to cow	67	670	— —
200,000 units to cow	100	1,000	1 qt. = ½ teaspoon C.L.O.
Irradiated yeast to cow			
Hess 30,000 units to cow	80	800	Partial protection
60,000 units to cow	160	1,600	Complete protection
Irradiation of milk			
Hess—carbon arc	50	500	Complete protection
Present study			
Irradiated milk—carbon arc	65	652	Protection
Non-irradiated milk	6	60	—
Milk from cows irradiated with carbon arc	20	200	Protection
Milk from non-irradiated cows	5	50	—
Irradiated yeast to cow—200,000 units	160	1,600	—
For comparison			
3 teaspoonfuls cod-liver oil	200	2,000	Complete protection
10 drops viosterol	800	8,000	Complete protection

arcs were about 25″ from the cows, at which distance the total ultraviolet intensity between the range of 2,000 to 4,000 Angström units was 6,400 micro-watts per sq. cm., or 640 ergs per sq. mm.

Each cow was irradiated for 15 minutes each day on one side only.

The assays upon the two separate rat colonies mentioned showed an average number of 22 units of vitamin D per quart of milk from the irradiated cows. The milk from the control group of cows showed an average of 5 units of vitamin D per quart of milk.

Table II records the results of the protective experiment upon 21 infants over a 6- to 8-month period; practically parallel to the infants fed upon irradiated milk. The same rigid requirements for clinical and X-ray diagnoses were maintained and a protective record almost equivalent to the infants fed irradiated milk may be noted in this table.

In addition to this protective study with milk from irradiated cows we have been much interested in determining the curative potency of such milk and have been surprised to find a similar curative power in infants with florid rickets. The laying down of the calcium in the zones of temporary calcification has been slower than with other antirachitic agents, but the bones have proceeded to complete healing. These infants have been followed in the hospitals mentioned and the blood calcium and phosphorus determinations have corresponded with the progress of the healing bones.

We prefer to obtain more data including both protective and curative experiments before making conclusive statements upon the antirachitic potency of milk from irradiated cows because of the previously unfavorable reports. However, we feel sanguine of its protective value. In Table III are listed the vitamin D units obtained by various investigators and including the present studies upon vitamin D fortified milk.

COMMENT

Our findings, particularly those concerned with the milk from irradiated cows, suggest that an even greater discrepancy may exist between the rat assays of antirachitic agents and their clinical value in the prevention and cure of human rickets. The prevention of rickets in a group of 21 infants under hospital control by means of 22 units of vitamin D per quart of milk from irradiated cows, would appear to necessitate further investigations of the unmeasured factors involved and further studies of the vehicles used for administration of vitamin D.

From the table which Hess and Lewis [1] published concerning irradiated milk, it is quite obvious that a number of the youngest infants they studied must have been receiving only 35 to 40 units of vitamin D per day, and yet the protection recorded was highly satisfactory. This number of units is not far in excess of the number of units of vitamin D administered to our group of 21 infants fed upon milk from irradiated cows.

Direct irradiation of milk can be carried out only where larger pasteurizing plants are available. In such places this would seem the method of choice, since it would afford, particularly to those of moderate means, a potent source of vitamin D at a cost only slightly above that of ordinary milk and at the same time assure its reaching the infant. Irradiation of the cow has certain advantages over this method. The danger of change of taste, alteration of chemical nature, destruction of other vitamins and some contamination by handling are all eliminated. It is equally suitable for use in those carefully controlled herds producing certified milk and herds in smaller communities producing a good grade of raw milk. Either method offers an appreciable saving of expense for institutions caring for a large number of infants such as that in which these experiments were conducted.

"Yeast milk" though higher in number of vitamin D units, is apparently no more efficacious per quart of milk for protection and is more expensive to produce.

We have had no experience with the method of adding vitamin D directly to the milk. We are interested now in comparing this method to those above, with especial reference to the number of Vitamin D units necessary to obtain equivalent results.

SUMMARY

The discrepancy has been emphasized again between the rat assays of antirachitic agents and the protective and curative value of such agents for human infants.

Three types of vitamin D fortified milk were studied; namely (a) irradiated pasteurized milk, (b) "yeast milk," and (c) milk from irradiated cows. Parallel studies were conducted on rats with all three types, and studies on infants with the first and third types. Some curative studies, however, were made upon infants with "yeast milk," the second type.

The amount of vitamin D by assay and the protection afforded infants against rickets by the first two types were found to be equivalent in most respects to the favorable results reported by other investigators.

Preliminary investigations of milk from irradiated cows, both by rat assay and by protective and curative experiments on human infants would suggest a definite increase in vitamin D potency over the milk from control cows. Twenty infants over a period of 6 to 8 months were protected from rickets by this antirachitic agent alone. One infant in the foundling home and a small number of other infants with definite rickets were cured by this same agent alone. We do not regard these data as conclusive until the group of infants has been followed for a longer period.

The rat assay on milk from irradiated cows approximated 22 units of vitamin D per quart of milk. The apparent effectiveness in preventing rickets in infants by such a small number of vitamin D units emphasizes the importance of certain unknown and unmeasured factors in vitamin D fortified milk which deserve further consideration and study.

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TUBERCULOSIS has been aptly termed the "Foe of Youth" and to fight this foe is the important work which more than 2,000 affiliated tuberculosis associations all over the country carry on throughout the year. It is to maintain this work and to continue to promote the organization of measures that will prevent the untimely death of so many thousands of our young people, that the penny Christmas seals are sold each year at this time. Each year brings improvement and with it the chance for a longer, happier life for all of us.—N. T. A., New York.

A Study of Lobar Pneumonia in Massachusetts: Methods and Results of Pneumococcus Type Determination, 1931-1932*

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EARLY in 1931 a study of lobar pneumonia in Massachusetts was begun. This study,[1, 2] financed by the Commonwealth Fund of New York City, comprises a study of the epidemiological factors involved in the spread of the disease; the production of concentrated antipneumococcic serum for treatment; and the organization of various areas of the state, selected by our Advisory Committee on Lobar Pneumonia. In them pneumococcus typing can be carried out so that patients may receive the benefits of early serum treatment.

Eleven selected areas have been organized embracing a population of about 2 million or approximately one-half that of the state. They include urban, rural, industrial, residential, seashore, and upland regions. It was decided to use the laboratories of the one or more centrally located hospitals of each area as the typing center for that area. The present paper will deal with the findings of the 20 laboratories coöperating in this work.

In order to obtain uniform and proficient technic in this work, the technicians were sent to Boston and trained in pneumococcus typing at the Boston City Hospital. Typing is carried out for Types, I, II, III and V (V, because of occasional cross-agglutinations with Type II). Pneumococci other than I, II and III are reported as Group IV. Cultures of Group IV are sent to the State Bacteriological Laboratory where typing is carried out to the full 32 (Cooper[3]) types, to determine their geographical distribution and frequency. Incidentally, this affords a measure of checking the accuracy of the typing in the outlying laboratories, for if a culture is sent in as a Group IV and turns out to be a I, II, or III, it is obvious that an error has been made.

A set of directions was drawn up and copies were supplied to each

* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

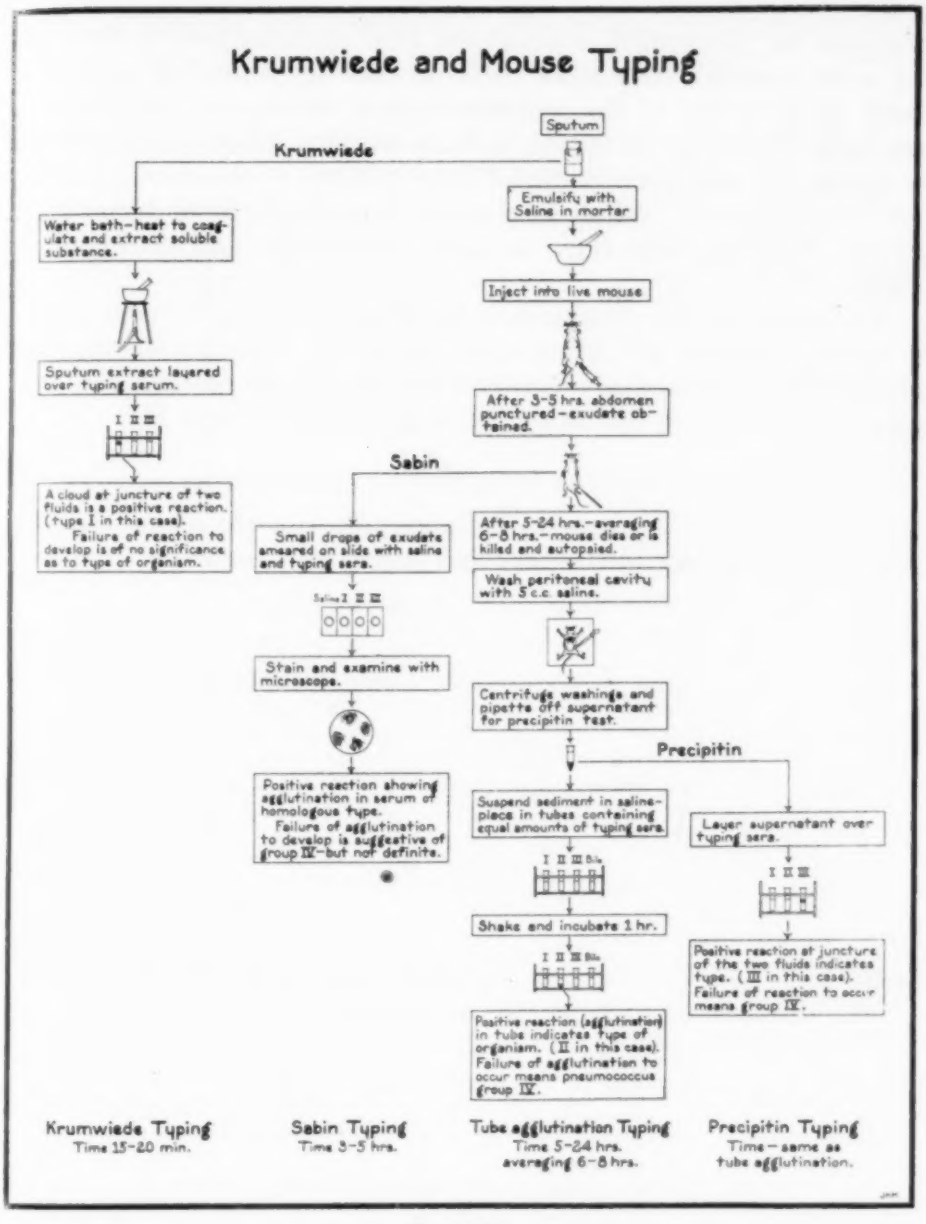
Krumwiede and Mouse Typing
Sputum
Krumwiede
Emulsify with Saline in mortar
Water bath—heat to coagulate and extract soluble substance.
Inject into live mouse
Sputum extract layered over typing serum.
I II III
After 3-5 hrs. abdomen punctured—exudate obtained.
Sabin
A cloud at juncture of two fluids is a positive reaction. (type I in this case).
Failure of reaction to develop is of no significance as to type of organism.
Small drops of exudate smeared on slide with saline and typing sera.
After 5-24 hrs.—averaging 6-8 hrs.—mouse dies or is killed and autopsied.
Saline I II III
Wash peritoneal cavity with 5 c.c. saline.
Stain and examine with microscope.
Centrifuge washings and pipette off supernatant for precipitin test.
Precipitin
Positive reaction showing agglutination in serum of homologous type.
Failure of agglutination to develop is suggestive of group IX—but not definite.
Suspend sediment in saline—place in tubes containing equal amounts of typing sera.
Layer supernatant over typing sera.
I II III Bl.
I II III
Shake and incubate 1 hr.
I II III Bl.
Positive reaction at juncture of the two fluids indicates type. (III in this case).
Failure of reaction to occur means group IX.
Positive reaction (agglutination) in tube indicates type of organism. (II in this case).
Failure of agglutination to occur means pneumococcus group IX.
Krumwiede Typing
Time 15-20 min.
Sabin Typing
Time 3-5 hrs.
Tube agglutination Typing
Time 5-24 hrs. averaging 6-8 hrs.
Precipitin Typing
Time—same as tube agglutination.

FIGURE I

technician. These give detailed procedure for typing sputum by the Krumwiede,[4] Sabin,[5] tube agglutination and precipitin methods[6]; and for typing material obtained from blood, throat, and other cultures, spinal and chest fluids, pus, and urine. The use of white mice in typing sputum and other suitable material has been adopted.

Given sputum, the technicians have been requested to try on each

specimen the Krumwiede, Sabin, and tube agglutination methods in the order named. Either the Sabin or tube agglutination acts as a check on the result of the previous method employed. An attempt was made to have every typing in these outlying laboratories checked by typing the organisms obtained from cultures of the mouse's heart blood or peritoneal exudate in plain or blood broth or on blood agar plates. This has been done in some laboratories and neglected in others.

To familiarize the physicians of the state with some of the methods of typing sputum and urine, two sheets of illustrations showing schematically the methods used and the usual time necessary to perform each have been distributed at large (Figures I and II).

TYPING RESULTS IN OUTLYING LABORATORIES

The number of typings in the laboratories of the areas over the state during the past fall, winter and spring is as follows:

	Area	*Number of Typings*
(1)	Beverly	30
(2)	Malden	43
(3)	Chelsea	(data not available—small number)
(4)	Newton	45
(5)	Boston	204
(6)	Brockton	19
(7)	New Bedford	13
(8)	Ayer	32
(9)	Worcester	122
(10)	Pittsfield	10
(11)	Great Barrington	3
	Total	521

Areas 2, 7 and 9 were not organized until well into the winter.

The distribution of types was as follows:

Type I	79
Type II	26
Type III	50
Group IV No pneumococci Streptococci Friedländer's bacilli	362
Total	517 *

* This figure is smaller than the total of 521 typings attempted because 5 specimens were urine. These gave negative precipitin reactions.

At first no request was made that cultures of all Group IV be sent to the State Bacteriological Laboratory for further typing. During the early winter such a request was made, and since cultures of most of Group IV have been obtained.

One hundred and seventy-one cultures have been received from the outlying laboratories and typed out to the full 32 types. (Table I.)

TABLE I

RESULTS OF EXAMINING AND TYPING SPUTUM, CULTURES AND OTHER MATERIAL AMONG THE THREE LARGE GROUPS

Type	*Cultures from Outlying Laboratories*	*Sputum Sent in by District Health Officers*	*"Regular" Typings*	*Type*	*Cultures from Outlying Laboratories*	*Sputum Sent in by District Health Officers*	*"Regular" Typings*
I	3 *	9	84	XXII	0	1	6
II	0	2	33	XXIII	1	0	6
III	4 †	6	82	XXIV	0	0	3
IV	8	1	16	XXV	0	0	0
V	13	6	31	XXVI	1	0	4
VI	2	0	4	XXVII	0	0	1
VII	4	4	16	XXVIII	0	0	4
VIII	13	9	40	XXIX	5	1	4
IX	3	4	16	XXX	0	0	4
X	9	2	12	XXXI	3	0	6
XI	2	0	20	XXXII	0	0	0
XII	1	1	5				
				Miscellaneous	60	..	..
XIII	2	0	8	No pneumococci	..	17	134
XIV	2	0	6	"Group IV"	..	4	77
XV	0	0	2	*Strep. hemolyticus*	9	2	31
XVI	0	0	1	Friedländer's bacilli	2	1	7
XVII	2	1	7				
XVIII	8	1	16	Untyped pneumococci	..	..	3
XIX	8	1	15				
XX	6	0	9	Total	172 **	73	716
XXI	1	0	3	Grand total all typings			960

* 1 sent for corroboration
† 3 sent to see if they were VIII
** 1 culture gave cross-agglutination with X and XX serums and is reported in both types.

Among the cultures sent in, only 2 of Type I and 1 Type III were sent in as Group IV.

STATE BACTERIOLOGICAL LABORATORY TYPINGS

During the past year typing has been carried out to the full 32 known types at the State Laboratory on all material sent there for this purpose. In the spring the demand became so great that an additional bacteriologist was taken on for this work.

The typings at this laboratory during the past year may be divided into 3 groups: (1) those done on Group IV cultures sent in from the outlying laboratories, (2) those on sputa sent in by the District Health Officers associated with this department, from

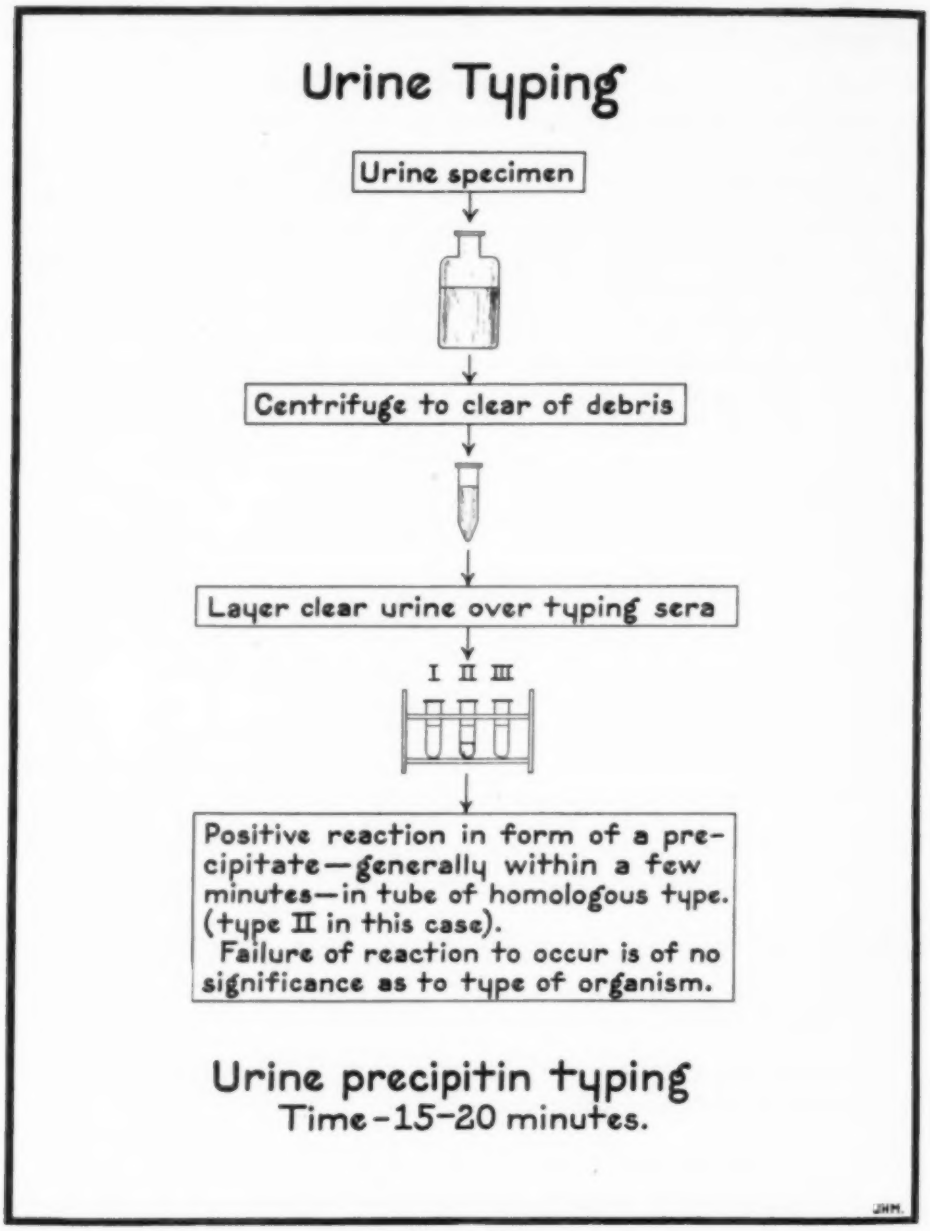
Urine Typing
Urine specimen
Centrifuge to clear of debris
Layer clear urine over typing sera
I II III
Positive reaction in form of a precipitate—generally within a few minutes—in tube of homologous type. (type II in this case).
Failure of reaction to occur is of no significance as to type of organism.
Urine precipitin typing
Time-15-20 minutes.
JHM.

FIGURE II

patients with lobar pneumonia cared for at home, and who are not receiving antipneumococcic serum, (3) the group of "regular" typings carried out on material of various sorts sent directly by physicians at large. (Table I.) The specimens in this last group have not all come from cases of lobar pneumonia; many are from cases of broncho-pneumonia and other respiratory diseases; conse-

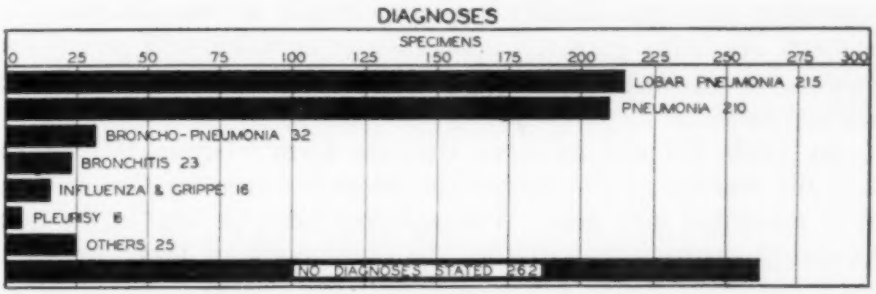

FIGURE III

quently, the frequency with which any particular type is observed cannot be compared with the reported occurrence of various types as the etiological agents in cases of lobar pneumonia alone. (Figure III.) This group represents a true picture of the variety of materials from hundreds of cases sent for typing by physicians of this state, and probably yields a picture similar to that which may be found by other state laboratories undertaking such work, and gives definite evidence that in Massachusetts, nearly every known type of pneumococcus can be found associated with respiratory disease.

Every specimen of sputum, chest or spinal fluid, or pus, received for typing which has yielded good pneumococci has been typed by one or more methods, and a vigorous attempt made to check each by cultures from the heart's blood of the mouse in plain or blood broth or on blood agar plates.

The routine methods employed on sputa have been (1) Krumwiede, (2) Sabin, and (3) tube agglutination, with or without precipitin test. (The final report to the physician on the result, if not previously rendered, was given here.) (4) In a few cases, typing has been done from heart's blood cultures, where the above methods have failed, (5) Occasionally, typing has been done from individually fished colonies.

The Sabin and tube agglutination (with or without the precipitin test) methods were used on chest or spinal fluids and pus. They were also cultured in broth and on blood agar plates directly.

On sputa, frequently the first 3 were done before checking from cultures, in order that an attempt might be made to evaluate the speed, accuracy and applicability of these various methods. The results will be discussed later.

A list of the organisms found in the sputa obtained from patients with lobar pneumonia who were cared for at home will be seen in Table I. These specimens were sent by the District Health Officers, and came from widely separated areas of the state. Data

concerning the case fatality rates, incidence of complications, and so forth, are being gathered upon this series which will give definite information upon this particular group of little known and much debated cases.

In Table I it will be noted that the term " Group IV " appears near the bottom of the table. In all such instances the specimens were inoculated into mice. Pneumococci could be seen in the mouse peritoneal exudate, but due to the overgrowth of other organisms, which increased in numbers upon further cultivation and exterminated the pneumococci, they could not be classified as to type. Unfortunately, the number of such was rather large.

If no pneumococci could be seen in direct smear of the mouse exudate, the report was " No pneumococci found." Hemolytic streptococci and Friedländer's bacilli were never reported, the former because they occur so often in normal throats their significance is uncertain, and the latter because there was no diagnostic serum available for the types known to be pathogenic for man. Such agglutinating serum has been obtained and henceforth Friedländer's bacilli will be reported. Records were kept where they were found and these findings are included here. No record has been made of *S. viridans,* nor of *B. influenzae,* when found. These organisms have occurred in varying numbers and there is great doubt of their clinical significance in the numbers found.

The third and last group of typings is the so-called " regular " done on sputum and other specimens sent directly to the laboratory. The results give an excellent gross picture of the variety of organisms likely to be encountered.

Among the " regular " typings the specimens upon which typing was requested were as follows:

	Number
Sputa	691
Chest fluids	8
Urines	7
Spinal fluids	5
Cultures of blood or pus	5
Total	716

It must be emphasized that the above specimens did not all come from cases of lobar pneumonia, but from many sorts of respiratory disease. The organisms reported are given in Table I.

The group of " regular " typings in Table I includes 15 instances where 2 types were isolated from the same specimen or definite cross-agglutination between 2 types occurred. These are reported under both types. The results of examination of 7 urines negative for I,

II and III, and of 8 specimens in which too few pneumococci were found to be typed are not included.

Summarizing the results of the "regular" typings noted in Table I, the distribution of the specimens as to organisms found is:

	Number	*Per Cent*
Pneumococci Types I to XXXII	464	64.7
Reported as "No pneumococci found"	134	18.7
Reported as "Group IV" pneumococci	77	10.8
Streptococcus hemolyticus	31	4.3
Friedländer's bacilli	7	1.0
Pneumococci—typical—but could not be typed with any of the 32 diagnostic sera available	3	0.4
Total	716	99.9

SEASONAL INCIDENCE

In an effort to determine the relative frequency with which the various types of pneumococci and other organisms occurred during the different seasons a series of charts have been prepared on which their monthly incidence has been recorded for 11 months, September 1, 1931, to July 31, 1932. Two groups of specimens have been combined. The results from sputa sent in by the District Health Officers have been added to those of our "regular" typings, as all of these specimens were sent to the laboratory directly from patients. (No Group IV cultures from outlying laboratories are included.)

The following charts (Figures IV to VII) give occurrence by months of the various organisms found in percentages, and show the

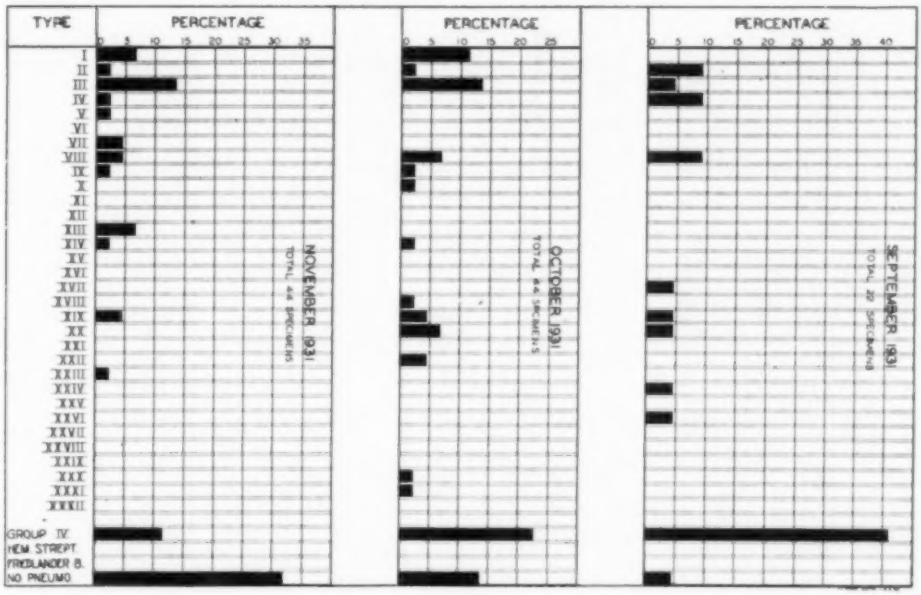

FIGURE IV

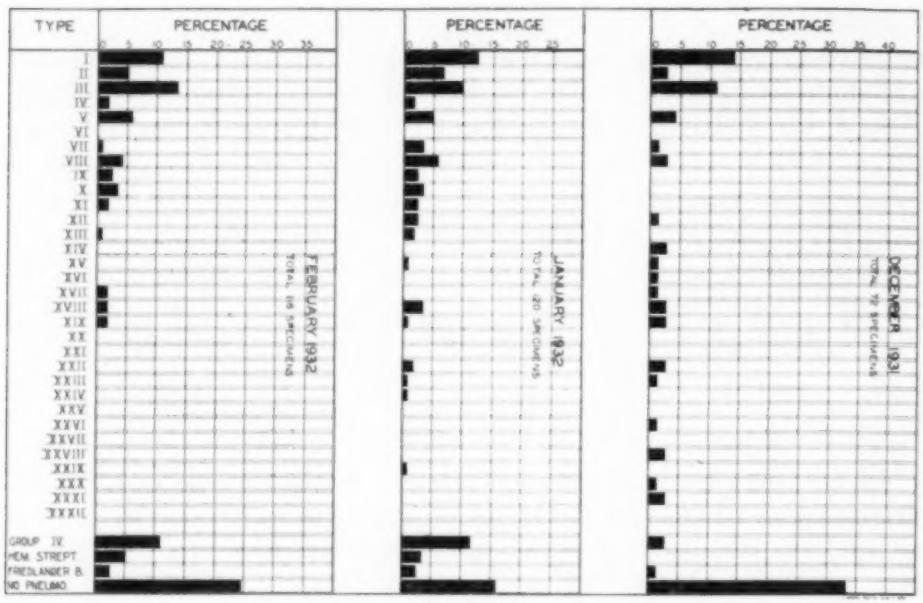

FIGURE V

results of typing 789 specimens. The various sub-types (IV to XXXII) were found more frequently during the winter and spring months December to May, than during the warmer months.

The approximate figures for this may be found in Table II. It will be noted that the percentage incidence of the sub-types (IV to

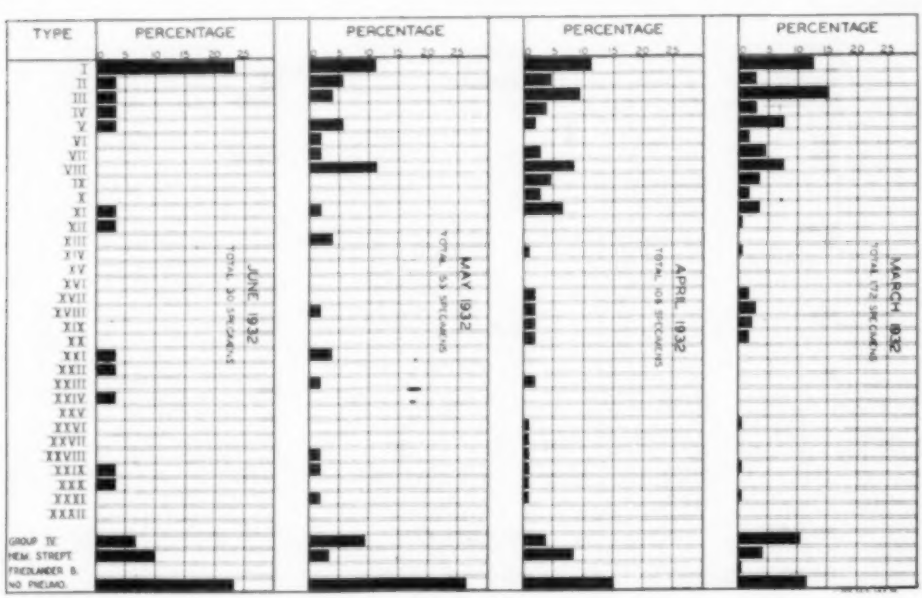

FIGURE VI

XXXII) remains more constant than does the actual number of different sub-types found; also, that Types I, II, and III comprise less than a quarter of the total 11 months' yield at the State Laboratory. There is every reason to believe that the figures for I, II, and III would be much greater were these typings done on consecutive cases of lobar pneumonia only.

TABLE II

Month	Percentage of Types Found (Approximate)		Percentage of Group IV and Other Organisms (Approximate)	Actual Number of Different Sub-types Found
	I, II and III Per Cent	IV to XXXII Per Cent	Per Cent	
Sept., 1931	13.6	40.7	45.4	7
Oct.	27.3	36.2	36.3	10
Nov.	22.6	31.7	43.2	9
Dec.	27.8	35.0	37.5	16
Jan., 1932	29.2	37.3	33.2	16
Feb.	30.5	26.1	43.2	11
Mar.	30.7	43.1	26.8	17
April	25.4	46.4	27.4	19
May	20.8	39.8	39.6	12
June	29.9	29.7	40.0	9
July	0.0	37.5	62.5	3
Approximate average for all 11 months	23.4	36.6	39.5	11.7

The lower chart in Figure VII summarizes the results for 11 months and shows the percentage incidence of the various organisms found September 1, 1931, to July 31, 1932—a total of 789 specimens including 764 sputa, a few chest and spinal fluids, a few urines, and blood cultures.

GEOGRAPHICAL DISTRIBUTION OF TYPES FOUND

There has been no especial geographical distribution among any of the 30 types of pneumococci found. The same type was isolated from individuals ill at the same time in widely separated regions of the state without apparent contact having occurred between the hosts.

Every type of pneumococcus (Cooper types), excepting XXV and XXXII, has been found among the specimens sent to the State Laboratory.

MULTIPLE FAMILY CASES OF LOBAR PNEUMONIA

Instances where 2 or more members of the same family have had lobar pneumonia within a few days or weeks of each other due to the same type of pneumococcus, have been decidedly uncommon and occurred only four or five times among nearly 1,000 cases typed either by our collaborators or at the State Laboratory.

ACCURACY OF TYPING METHODS

It is difficult, if not impossible, for us to give other than an estimation of the accuracy of the various methods of typing used. It is our experience that when the results of a typing by the Krumwiede, Sabin, or tube agglutination method are definitely positive, they are over 99 per cent accurate. The reporting of indefinite results leads to error and is to be discouraged.

The following figures throw light upon this attempt to estimate accuracy. The number of typings by the method used and the number of these checked by another method or by culture is indicated. Where a definite type has been determined and later yields a different one (not including cross-agglutinations and specimens with 2 types) on culture, such findings are indicated as discrepancies and for all practical purposes may be counted as errors in typing.

Typing Method	*No. of Specimens Yielding Types*	*Total No. of Typings Checked*	
		Those in Agreement with Original Type Found	*Those NOT in Agreement with Original Type Found*
Krumwiede	57	53	3
Sabin	380	360	4
Tube agglutination	150	143	2

The Krumwiede takes from 30 to 60 minutes. The Sabin usually gives positive results in 5 to 8 hours. The tube agglutination and/or the precipitin method can be done from 6 to 24 hours after inoculation of the mouse.

ADVANTAGES AND DISADVANTAGES OF METHODS

Krumwiede method of typing sputa: This method, when positive, yields a very speedy result. Usually, however, it has been found that the sputa sent to the State Bacteriological Laboratory for typing are insufficient in amount for this method, or when boiled become cloudy or otherwise unsatisfactory. For these reasons the usefulness of the Krumwiede has been greatly decreased. With some attention paid to the gathering of suitable specimens in satisfactory amounts it should be possible to increase greatly the number of positive typings by this very valuable rapid method.

Figure VIII shows the small number of positive Krumwiedes obtained from 683 sputa, being only 7.9 per cent of the whole (Krumwiedes were not done for Types IV to XXXII). The method yielded 30 per cent positives for I, II, and III among those sputa

from which a satisfactory supernatant fluid for layering was obtained. For any individual laboratory, in close association with patients, it should be possible to better this record with ease.

The results of the Krumwiede method of typing among sputa later proved to contain Type I, II, or III pneumococci are shown in Table III.

TABLE III

RESULTS OF TYPING BY VARIOUS METHODS

Results with specimens containing	Krumwiede				Sabin				Tube Agglutination			
	No. of specimens available	No. tried	No. positive	Per cent positive among those tried	No. of specimens available	No. tried	No. positive	Per cent positive among those tried	No. of specimens available	No. tried	No. positive	Per cent positive among those tried
Type I	89	31	24	77	83	73	69	95	44	44	40	91
Type II	35	14	12	86	27	25	24	96	12	12	11	92
Type III	74	27	18	67	63	54	51	95	34	34	31	91
Types IV to XXXII inclusive	...	...	...	...	255	253	232	92	93	74	66	89

Sabin method of typing specimens: In our experience this method will give a positive result on the largest number of specimens (sputa, chest, or spinal fluids, pus, and so forth) in the shortest period of time of any used; and is readily learned by new technicians.

Figure IX shows the results with this method. A total of 778 specimens were received which might have been put into mice, but due to the character and age of some this procedure was not always followed out though seven hundred and thirty-one were inoculated into mice. Sabins were not done on all of these for various reasons, the principal one being that in a large number of cases examination of the mouse exudate showed a very mixed growth or no pneumococci. Of the 731 specimens, 448 were tried with typing sera (this number includes 43 which never yielded a pneumococcus of any kind and 7

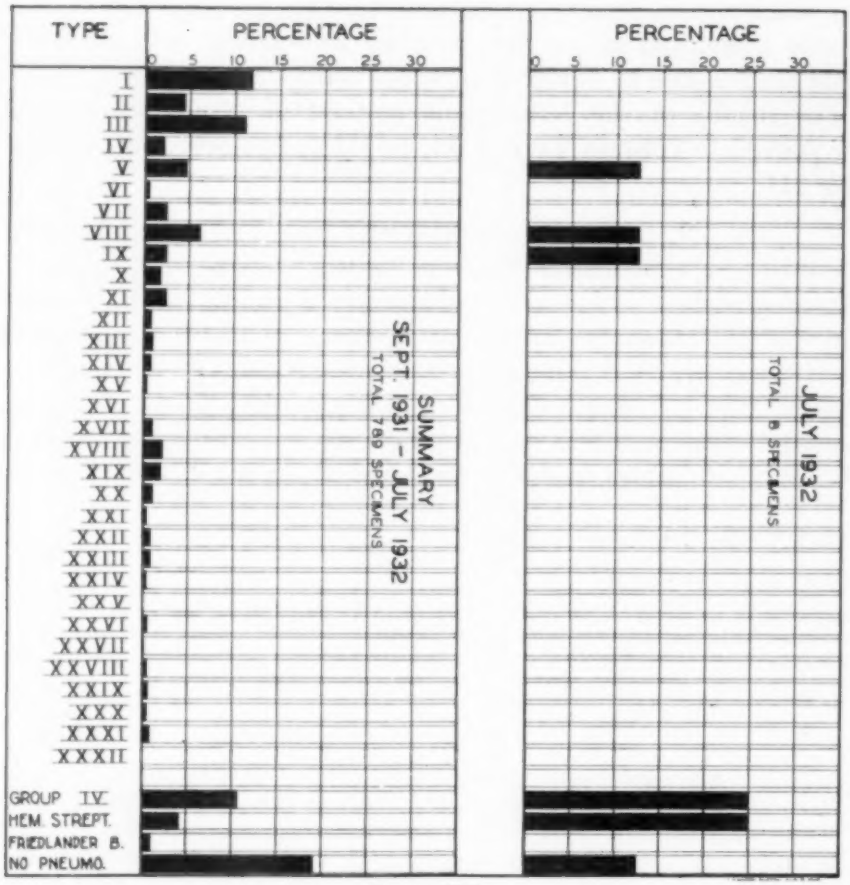

FIGURE VII

tried only for I, II, and III which later yielded a higher type). Of the 778 specimens, 376, or 48.3 per cent, gave a positive result for some type, or 83.9 per cent of those tried. Of those tried, 22 were negative and later on culture or tube agglutination yielded some definite type.

In estimating the efficiency of the Sabin method it is found that

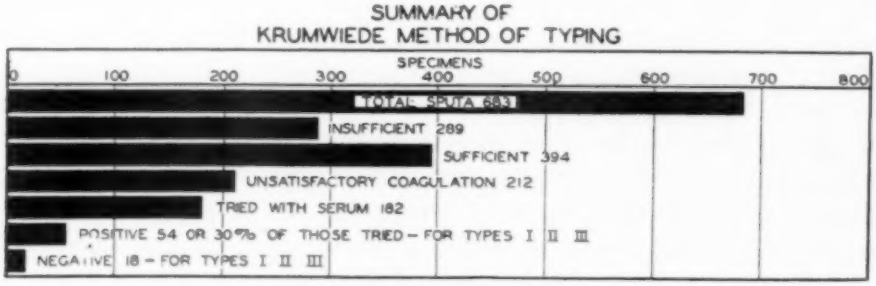
SUMMARY OF
KRUMWIEDE METHOD OF TYPING
SPECIMENS
0 100 200 300 400 500 600 700 800
TOTAL SERUM 693
INSUFFICIENT 289
SUFFICIENT 394
UNSATISFACTORY COAGULATION 212
TRIED WITH SERUM 182
POSITIVE 54 OR 30% OF THOSE TRIED - FOR TYPES I II III
NEGATIVE 18 - FOR TYPES I II III

FIGURE VIII

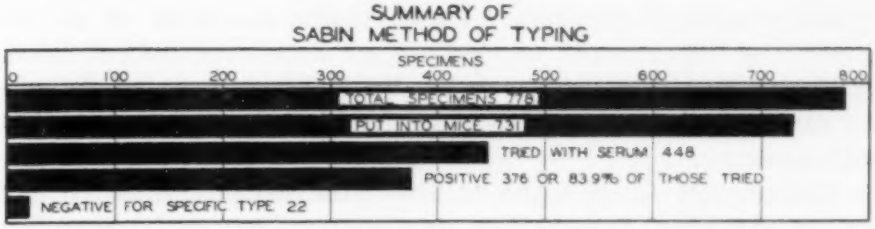

FIGURE IX

among 398 specimens that contained some definite type of pneumococcus, 376 or 94.5 per cent gave a positive result.

The results of the Sabin method among specimens proved to contain pneumococcus of some definite type (from I to XXXII) may be seen in Table III.

Tube agglutination method of typing: This method offers no particular advantage except in occasional instances where the Sabin has been negative, due chiefly to the presence of mixed culture. Of course, the tube agglutination is an old and well tried method and as such has rendered, and still does render, invaluable service. The great disadvantage lies in the fact that so much time is required for its performance.

Owing to the lack of time during the past year tube agglutinations were omitted on some specimens when satisfactory results were obtained by the Krumwiede or Sabin. These were checked by cultures, usually heart's blood cultures from the mouse. There were 273 specimens on which our records for tube agglutinations are complete. (See Figure X.) Of these, all 273 were tried. One hundred and forty-eight or 54.2 per cent were positive which is also 54.2 per cent of those tried. Sixteen of the negatives contained some specific type. Of the remaining 109, 90 never yielded a definite type by any method and the others were not typed out far enough to include the specific type later obtained from culture.

The results of tube agglutinations among specimens proved to contain pneumococci of some definite type (I to XXXII) are shown in Table III.

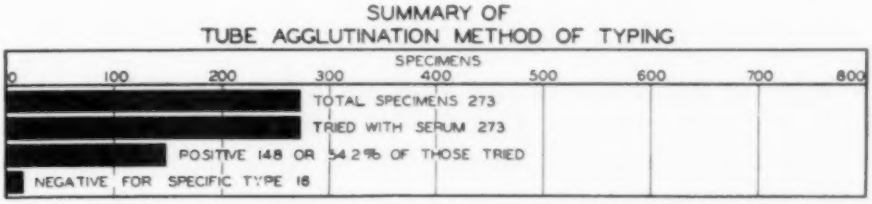

FIGURE X

Other methods of typing: The precipitin test as an aid to typing (using the supernatant of centrifuged mouse peritoneal exudate washings) has been used occasionally and was most useful where the mouse peritoneal exudate contained other organisms with the pneumococcus.

Occasionally Avery broth cultures (the so-called artificial mouse method of typing) have been made simultaneously with mouse inoculations, using the same specimen. Such data are being collected and will be reported later.

CHECKING BY CULTURES

Efforts were made to check every type previously determined from a culture of the organism. Among 789 typings only 43 or 5.4 per cent were not checked by either some other method of typing or by culture, and most of these were checked from cultures of the organism. The majority of such cultures were made from the heart's blood of the mouse in plain or blood broth or on blood agar plates. Most of those not checked could not be typed by any rapid method due to the presence of other organisms; the type was ascertained from cultures of individually fished colonies or cultures of the heart's blood of the mouse.

MISCELLANEOUS FINDINGS

Two distinct types of pneumococci have been isolated from 4 specimens, culture of the mouse's heart blood yielding a different type from that obtained by one or more of the rapid methods of typing. In each case both types were obtained by more than one method. In 3 other instances pneumococci have been found in conjunction with another organism, both in the mouse's peritoneum and in the heart's blood culture. The list follows:

PNEUMOCOCCUS TYPES OR OTHER ORGANISMS

Number	*Type*	*Type*
1	III from peritoneal exudate;	XX from heart's blood
1	III from peritoneal exudate;	V from heart's blood
1	IX from peritoneal exudate;	V from heart's blood
1	I from peritoneal exudate;	II from heart's blood
2	III with Friedländer's bacilli	
1	IV with Friedländer's bacilli	
1	XXVI with *Streptococcus hemolyticus*	

Many of the above findings were also verified by culture of individually fished colonies. Due to the great amount of time which must be used in carrying out this type of work little has been done in this direction.

Since the figures in this article were compiled, a single Type I

colony has been isolated from the heart's blood culture of a reported Type XXII (by Sabin). The heart's blood broth culture gave a negative I and a positive XXII macroscopic agglutination. The heart's blood was also streaked on to a blood agar plate from which colonies of Type XXII and a single colony of Type I were isolated. Similarly, a strain agglutinating with both X and XI sera has been isolated from a reported Type I.

In seven other instances cross-agglutination occurred in the Sabin. Two of these strains were never obtained in pure culture. Two lost their dual characteristics upon cultivation and later agglutinated only with 1 type serum. The other 3 (isolated by single colony fishing) maintained the property of cross-agglutination for as long as they were kept, agglutinating with 2 sera both in the tube and by stirring on the slide. The types showing cross-agglutination were as follows:

Types II and XIX
Types IV and IX (never obtained in pure culture)
Types VIII and XI (later, only XI)
Types XI and XV
Types XVI and XXVIII (never obtained in pure culture)
Types XXVI and XXIX
Types XXIII and XXX (later, only XXX)

DISCUSSION

A review of the bacteriological findings show that there has been a large amount of work done on sputum examination and pneumococcus typing. Perhaps the major difficulty encountered was that of obtaining a satisfactory specimen of sputum (or other material) of suitable quality and quantity for typing. In the outlying laboratories less difficulty has been experienced as they are in much closer association with physicians and patients than is the State Laboratory, where over 90 per cent of the specimens come by mail. Roughly, one-half of the specimens sent for typing were 24 hours old on arrival, and most of the remainder were older. Among such old specimens, as is well known, pneumococci tend to be over-grown by other organisms and die out, thus making typing difficult if not impossible, and the isolation of pneumococci in pure culture very laborious and wasteful of time. Sputa received by ordinary mail during the warm months are especially difficult to type. Specimens of satisfactory quality and quantity should be specifically requested and if specimens cannot be brought by messenger they should be sent by special delivery mail.

To carry out pneumococcus typing on a large scale, a 24-hour service is, of course ideal, but is seldom obtained. In lieu of such an ideal service, arrangements have been made in the coöperating laboratories (in the areas organized for the serum treatment of cases of lobar pneumonia) to have all specimens arriving at night for typing, injected into mice at once in order that the typing may be done in the morning by the technician. Mice dying during the night should be placed in the refrigerator so that their peritoneal exudate will not be over-grown with *B. coli*. In most instances specimens arriving in the early evening have been typed that night.

At the State Laboratory the specimens for typing are taken from cases of all sorts of respiratory diseases, of many days' duration, so that with the majority of specimens the acute need of saving a few hours of time has not arisen. Even so, there was a sufficiently large number of specimens, from early cases of lobar pneumonia in which serum treatment was contemplated, to keep the laboratory force (2 workers) very busy during the pneumonia season, often working 12 to 16 hours a day during that period (January through April). An attempt was made to check every typing by cultures of the organism, obtained chiefly from the mouse's heart blood. In some instances as many as 5 different methods of typing have been done upon a specimen to ascertain the value of each method and afford data for a comparison of the methods. Typings are now reported to physicians as "Type I," "Type II," "Type III," "Group IV—type V," or whatever the sub-type happens to be, or "Group IV—type undetermined—advise another specimen."

When 2 types are obtained from a single specimen or cross-agglutination occurs, several things can be done to clear up the problem. Another specimen of sputum should be requested and the urine typed. From the clinical standpoint, cultures of blood and/or lung puncture, with the typing of any pneumococci found, will usually settle the matter.

The Krumwiede is a very valuable method of typing in that it is a great time saver. A negative Krumwiede is of no significance and neither a tentative nor final report of Group IV should be made upon this finding. A slight hazy ring or indefinite cloudiness at the line of juncture of the two fluids in the tube is not significant and should not be reported. About one-half of these "suggestive" reactions have later proved to be some other type. Seventy-five per cent of those sputa yielding a clear liquid for layering have been positive and about 25 per cent negative, for Types I, II, and III, some one of which was later found in the specimen.

The Sabin method is the most generally satisfactory and useful for accurate and rapid determination of type. Where pneumococci are seen in the mouse exudate but show no agglutination with Types I, II, or III sera, a tentative report of "Group IV" may be made and is nearly always correct. Considering Types I, II, and III only, the Sabin has failed while the tube agglutination has yielded a type, in about 1 of 75 instances. From observations made in various laboratories this proportion of failures might be expected to be greater, as most technicians do not stir the mixture of organisms and serum sufficiently before drying it.

Usually good pneumococci give a clear-cut result with the Sabin, and in such cases it has proved safe to assume the result correct. "Naturally occurring clumps" do sometimes occur, however, in one smear only and not in the others. In such cases experience is necessary for an accurate diagnosis. If there is any question as to the reading of the Sabin, it should be repeated. The reporting of indefinite results leads to error.

If the typing is being done out to the full 32 types, all should be tried on every specimen. At the State Laboratory during the rush season, we did not always adhere to this policy and were led into some difficulty with supposed cross-agglutinations which later turned out to be clearly one of the higher types not tried at the first typing. Subsequent checking with mouse's heart blood cultures confirmed these results. (Only those cross-agglutinations which were very definite in both types are recorded in the earlier part of this paper.)

A final report of "Group IV" should not be made until after the tube

agglutination method has been carried out, with incubation and frequent shaking of the tubes for 1, or preferably, 2 hours. Both undiluted and diluted sera should be set up. Freshly isolated organisms of high virulence occasionally do not agglutinate in diluted serum; sometimes they do not agglutinate in the undiluted, probably due to the "pre-zone" phenomena.

The tube agglutination method has not proved as sensitive as the Sabin and fewer positives were obtained with it than with the Sabin.

Considering Types I, II, and III only, as these are the predominating and the ones of greatest immediate or potential interest regarding the specific treatment of illness caused by them, it is found that among a total of 216 such types found, 9 errors were made. In 6 instances the report was "Group IV" and 1 was "No pneumococci found"; in 2 a Type III was reported as a Type I,—1 on the result of a "suggestive" Krumwiede (such as were later disregarded) and 1 on the result of a tube of agglutination. Those reported as "Group IV" and "No pneumococci found" yielded, with 1 exception, mixed mouse exudates and were finally typed from mouse's heart blood cultures or from colonies fished from cultures. One yielded a practically pure culture of Type I, both from the mouse's exudate and heart's blood culture, and had failed to give a positive result either by the Sabin or the tube agglutination method.

NOTE: We are much indebted to Edith Beckler, Director, Massachusetts State Bacteriological Laboratory, for the great aid and encouragement given us in carrying out this work. Likewise, Georgia Cooper of the New York City Laboratories has been very helpful in rendering valuable assistance in many ways. We wish to take this opportunity to express our thanks to both Miss Beckler and Miss Cooper for their many kindnesses.

Much of the diagnostic sera used throughout this work was obtained from Miss Cooper in New York City.

CONCLUSIONS

1. Pneumococcus typing is being requested by increasing numbers of physicians in Massachusetts.

2. During the past winter all 32 (Cooper) types of pneumococci excepting Types XXV and XXXII were found.

3. There was no especial geographical distribution evident of any of the types found.

4. Multiple cases of lobar pneumonia occurring in the same family at approximately the same time were very uncommon.

5. The Krumwiede, Sabin and tube agglutination methods of typing were and still are largely used and were found to be over 99 per cent accurate when definitely positive.

6. The Sabin method of typing has given a greater number of accurate positive typings in a shorter period of time than any other method studied, and is a method readily learned by technicians inexperienced in this work.

7. Of 789 specimens typed at the State Bacteriological Laboratory during the 11 months, September 1, 1931, to July 31, 1932, the type of pneumococcus found was checked in 94.6 per cent of the cases by a second method of typing or from a culture of the organism.

8. The various sub-types (Types IV to XXXII) were found more frequently during the 6 winter and spring months, December to May, than during the warmer months.

9. In view of the results to date, and until conclusive proof to the contrary is

obtained, it is felt that every type determination done by the Krumwiede, Sabin, or tube agglutination method should be checked by some other method of typing. Typing the organism obtained from cultures of the mouse heart's blood affords the most valuable means of checking.

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The Private Practitioner and Preventive Medicine

NOTHING is more difficult than to determine the beginning or the end of great events. All we can say today is that we have been the witnesses of the greatest epoch of advance in the science and art of medicine of which there is any record in the history of mankind. Not the 5th century B.C. in Greece, nor the great 13th century in Europe, not the Renaissance itself, can show a similar acquisition of new knowledge and its application as occurred in the hundred years following 1832. We can say even more: in no previous age has there been such growth of the conception of preventive medicine. . . .

When we reflect upon modern preventive medicine we naturally think of the change and improvement which has occurred in our external environment. We think of the great pioneers and their work for the provision of public and wholesome water supplies, for the isolation of the sick, the removal of nuisances, the reform of housing, drainage, sewerage and sewage treatment, the inspection of food, the Factory Acts, and vital statistics. Looking back we see what they did, and are more grateful than their contemporaries to Chadwick and Simon and Farr, to Bentham and the Mills, to Lord Grey, to Owen and Cobbett, to Lord Shaftsbury, and to the statesmen who took occasion by the hand. When we reflect again, our minds turn to the masters of physiology who illuminated the 19th century—to Helmholtz, Claude Bernard, and Carl Ludwig; they were followed by the masters of pathology, Virchow, Pasteur, and Koch. Perhaps we remember even the great clinicians who created and led professional opinion, Bright, Addison, and Hodgkin—the Guy's trinity—Gull and Jenner, Osler, Allbutt, and Barlow; and we wonder whether, after all, it is not the work of these eminent men which laid the foundations of prevention. Lastly, we are learning to see that preventive medicine owes an irredeemable debt to Edward Jenner, to the anesthetists Morton and Simpson, to the antiseptic principles of Lister, to the discoverers of the causes of disease, such as Pasteur, Koch, and Manson, and to the "immunizators" who followed them. . . . —Sir George Newman, *Brit. M. J.*, July 30, 1932, p. 190.

Incidence of Tularemia in New York State*

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THE apparent limitation of tularemia to certain sections of the United States is surprising in view of the great variety of animals and birds which have been shown to be susceptible to this disease. So far as can be determined, only 12 cases, enumerated in Table I, are known to have occurred in New York State, and 10 of them were attributed to the handling of rabbits either known or thought to have been imported from other states. In but 1 instance (case No. 3) was a wild animal in this state, a deer, indicated as the source of the incitant. Since no reference has been found in the literature to this species having been infected with *B. tularense*, a brief history may be of interest.

The patient, a man, frequently butchered and skinned animals, especially during the hunting season. He handled the carcasses of raccoons and hogs 2 days after the first symptoms developed, but the information obtained indicated that there had been no opportunity for infection from these or other animals for a considerable time prior to his illness. On November 8, 1930, during a hunting trip, he injured his left index finger while handling his rifle. Later that day, he dressed a deer which he had shot, and, on November 10, skinned the animal.

On November 13 and 14, he complained of feeling ill and thought he had "grippe." Congestion and pus formation were noted at the site of the wound on his finger. Dr. A. L. Hayes of Willsboro, N. Y., the local health officer, was consulted about 3 weeks after the injury occurred. At that time, in addition to the lesion on the finger, which still persisted, a painful gland, approximately the size of a pigeon's egg, was noted in the left axilla. A clinical diagnosis of tularemia was made, and a specimen of blood, sent to this laboratory on December 2, agglutinated *B. tularense* in a 1:320 dilution.

* Read before the Central New York Branch, Society of American Bacteriologists, Syracuse, N. Y., June 24, 1932.

When the patient was visited on December 6 by Dr. Schleifstein, a member of the laboratory staff, his condition had markedly improved; the swelling in the gland had subsided, and the lesion on the finger was nearly healed. Washings of the ulcer in salt solution, however, were injected subcutaneously into 2 guinea pigs and some of the material was rubbed on to the abraded skin of 2 others. One of the animals inoculated subcutaneously died within 5 days. Only hemolytic streptococci developed in the cultures prepared at autopsy. Upon histological examination, however, even though streptococci were present, lesions characteristic of tularemia were found. An emulsion of the spleen was rubbed on to the abraded skin of 2 other guinea pigs, and a third was inoculated subcutaneously. These 3 animals died within from 5 to 7 days. Gross lesions typical of tularemia were noted at autopsy and *B. tularense* was isolated from cultures prepared from the spleen.

The 12th case (No. 8 in Table I) occurred as the result of a laboratory accident. During the autopsy of a guinea pig infected with *B. tularense,* a member of the staff broke a glass-headed push pin which pierced his finger through his rubber glove. Six days later, he became ill. The general symptoms reported were fever, chills, gen-

TABLE I

CASES OF TULAREMIA REPORTED IN NEW YORK STATE FROM JANUARY 1, 1927, TO MARCH 1, 1932

Case No.	Year	Patient's occupation	Probable source of infection	Reported by
1	1927	Club steward	Rabbits purchased for food	Murphy, J. A.,[1, 2] Buffalo New York State Health Dept.[3]
2	1928	Housewife	Rabbits purchased for food	New York City Health Dept.[4]
3	1930	Employed in paper mill	Deer shot in New York State	New York State Health Dept.[5]
4	1930	Butcher	Rabbits handled in market	New York City Health Dept.[6]
5	1930	Butcher	Western rabbits handled in market	" " " " " [7]
6	1930	Butcher	Rabbits handled in market	" " " " " [8]
7	1931	Housewife	Rabbits purchased for food	" " " " " [8] Kaufman, S. M.,[9] New York City
8	1931	Pathologist	Laboratory accident	(Described in text)
9*	1931	Butcher	Illinois rabbits	Westchester Co. Health Dept.[10]
10*	1931	Butcher	Illinois rabbits	Westchester Co. Health Dept.[11] New York City Health Dept.[12]
11	1931	Butcher	Rabbits handled in market	New York City Health Dept.[13]
12	1932	Housewife	Missouri rabbits purchased for food	Bentz, C. A.,[14] Buffalo New York State Health Dept.[15]

* These patients handled rabbits in the same market

eral malaise, profuse sweating, weakness, and intense occipital headache. The temperature fluctuated from 100 to 104° C. and returned to normal by lysis 23 days after onset. No local manifestations at the site of infection, nor involvement of the regional lymph glands were observed at any time. Blood collected on the 4th day of illness failed to agglutinate *B. tularense,* but serum obtained on the 10th and 21st days agglutinated this microörganism definitely in 1:20 and 1:640 dilutions, respectively.

Opportunities to study the agglutination reaction of *B. abortus* in serums from patients having tularemia have been limited. Serums from only 5 of the cases which are known to have occurred in this state were tested in our laboratory, 2 being those just described. That from case No. 3, which agglutinated *B. tularense* in a 1:320 dilution, agglutinated *B. abortus* in a 1:80 dilution. The others gave reactions with *B. tularense* in dilutions of 1:80, 1:320, 1:640, and 1:2,500, respectively, but failed to agglutinate *B. abortus* in a 1:10 or higher dilution. Francis [16] states that he obtained agglutination of *B. abortus* with 129, or 22 per cent, of 570 serums from patients having tularemia. In only 12 instances, however, did these reactions approximate the degree of those obtained with *B. tularense.*

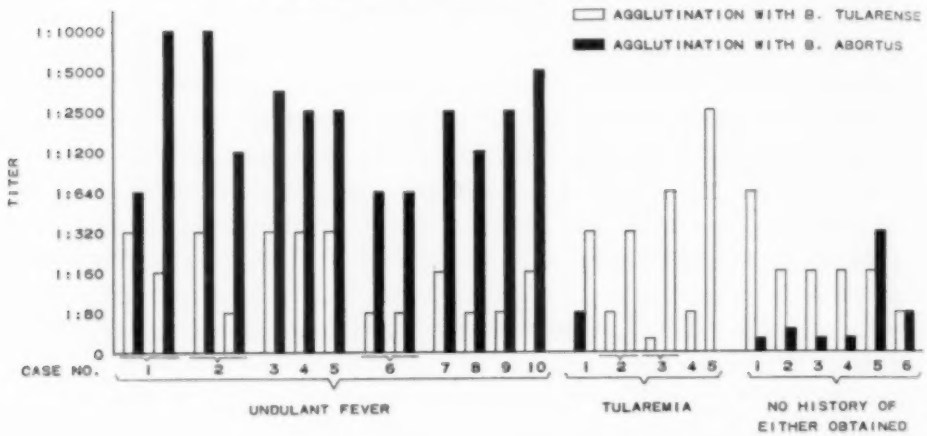
In order to secure information in regard to the occurrence of unrecognized cases of tularemia in New York State, the testing with *B. tularense* of blood submitted for other serological examinations was undertaken as a routine procedure in 1928. The specimens selected were those which were accompanied by a history suggestive of a febrile disease or which reacted in a presumptive test with *B. abortus.* This study has also furnished further data relative to the incidence of agglutination reactions with *B. tularense* in serums from cases of undulant fever. Francis,[16] who has examined specimens from various parts of the country, in many sections of which tularemia is fairly prevalent, reports agglutination of this microörganism by 31, or 33 per cent, of 93 serums from patients having undulant fever.

Among over 5,000 serums tested in our laboratory with both *B. abortus* and *B. tularense,* exclusive of those from the 5 cases of tularemia already discussed, approximately 800 gave agglutination with *B. abortus,* while only 19, from 16 patients, reacted with *B. tularense* in a 1:80 or higher dilution. Ten of these 16 patients had symptoms of undulant fever and their serums gave agglutination with *B. abortus* in appreciably higher dilutions than with *B. tularense.* No clinical history of tularemia or undulant fever could be elicited in the other 6 cases. Four of the serums from these patients reacted with *B. tularense* in higher dilutions than with *B. abortus,* the 5th had a

higher titer with the latter antigen and the 6th agglutinated both microörganisms in a 1:80 dilution. A comparison of the reactions with the 2 antigens is presented in Chart I.

CHART I

CROSS-AGGLUTINATION WITH B. TULARENSE AND B. ABORTUS IN A SERIES OF APPROXIMATELY 5000 SPECIMENS



Nonspecific agglutination reactions with *B. tularense* in serums from patients in New York State having undulant fever—at least with the antigens used in this study—would seem to be almost negligible. As the serums of persons who have had tularemia are believed to retain agglutinative properties for many years, if not permanently, the small percentage of reactions obtained tends to confirm the opinion based on clinical observations, that the disease is extremely rare in this state.

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Serology of Syphilis from the Standpoint of the Public Health Laboratory*

With Special Reference to Precipitation Methods

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FOR various reasons the choice of a method or methods for the serological diagnosis of syphilis continues to be a problem of prime importance in public health laboratories.

In the first place, there can be no denial of the widespread prevalence of the disease, especially in the larger cities and towns, and the fact that it is one of great importance from the standpoint of public health and economics.

In the second place, it is generally admitted that laboratory examinations continue to be the chief means of diagnosis at the command of the large majority of practitioners of medicine. For the relatively few expert syphilologists, clinical training and experience in diagnosis and treatment reduce the demand and necessity for laboratory aids, but even under these circumstances everyone skilled in syphilology must admit that in the diagnosis of concealed or so-called latent syphilis and as a guide in treatment, the serological tests are indispensable. Certainly the history alone of not a few victims of the disease may be notoriously misleading and in the latent or concealed stages coincident with good general health its detection by clinical methods alone may readily escape the most expert. No one can even calculate with reasonable accuracy the incidence of unsuspected syphilis, and for the detection of these the various serological tests have played and must continue to play a very important rôle.

It is sometimes stated that the diagnosis of syphilis should never be made in the laboratory; on the contrary it is easily proved that in

* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 15, 1932.

not a few instances the diagnosis of primary or acute and chronic syphilis can be made only in the laboratory. I may state therefore on the basis of both clinical and serological experience, that the laboratory tests for syphilis must continue to play a very important part in both diagnosis and treatment with the great majority of both general practitioners and specialists in medicine and surgery.

In the third place, relatively few public health laboratories enjoy the privilege of close contact with experts or clinics devoted to syphilology for checking the results of their serological work. This places upon them an added responsibility and necessity for the most accurate work with special reference to a choice of method or methods to be employed. Furthermore, the great majority of reports are sent to general practitioners who under the circumstances must accept the results and give them great weight in arriving at diagnosis and arranging therapeutic programs. A mistake in serology in either a positive or negative way may be of no great consequence to the expert syphilologist but to the less experienced physician it may be and usually is a serious matter sometimes associated with tragic consequences. I repeat therefore that all serologists and laboratories engaged in the serum diagnosis of syphilis assume a great responsibility, but in none is this responsibility quite so heavy as in the case of the public health laboratory and especially as it represents the hope and only means at the command of a large number of physicians for the aid so urgently required in the diagnosis of syphilis among indigent individuals and those who cannot afford the services of the specialist.

Of importance to all laboratories, but more especially in the case of public health laboratories without any detailed information concerning the clinical status of patients, is the question of the specificity of the serum reactions for syphilis with particular reference to weakly positive and unexpectedly positive reactions. During the active stages of syphilis with large amounts of antibody in the blood, most any of the numerous serological tests are apt to yield positive reactions and present no difficulties in diagnosis; but in concealed and unsuspected or doubtful cases the serum tests should possess above everything else a reliable practical specificity for syphilis so that proper reliance may be placed upon all positive reactions including those that are but weakly and unexpectedly positive. Under these circumstances it is proper to place the burden of proof on the clinician rather than on the serologist when the question of diagnosis is raised or disputed, and require the former to prove that syphilis is absent rather than to require the latter to prove that it is present or to seek various technical reasons and excuses for the positive reports.

Every experienced serologist knows that both complement-fixation and precipitation procedures may be made too sensitive with the risk of securing nonspecific or falsely positive reactions with the sera of non-syphilitic individuals. Personally I would much rather run the risk of securing an occasional falsely negative reaction than a single falsely positive one, and I think this attitude and practice is especially befitting the public health laboratory without the benefit of close contact with the expert syphilologist for the final evaluation of disputed results. What is particularly needed by all laboratories and especially the public health laboratory, is a test or tests possessing the maximum of specificity consistent with sensitiveness in order to earn the confidence of the medical profession in the significance of positive reactions and the great risk of error and responsibility involved in ignoring weakly positive reactions if they happen to be unexpected or out of harmony with preconceived clinical diagnosis.

As stated, the test or tests employed for the serum diagnosis of syphilis should possess the maximum of sensitiveness consistent with specificity because in the majority of instances it is in the concealed or doubtful case or treated case of syphilis with but small amounts of antibody in the blood that the aid of serum diagnosis is most urgently required.

In other words, while complement-fixation and precipitation tests serve a useful purpose in confirming the clinical diagnosis of syphilis, yet there can be no denial of the fact that they should be made especially valuable and available for the diagnosis of unsuspected or concealed cases when diagnosis is difficult or impossible by other means.

Furthermore, the maximum of sensitiveness consistent with specificity is required when serum tests are employed as guides in the amount and kind of treatment to employ. To the best of my knowledge syphilitic infection is to be regarded as present as long as reliable tests yield truly positive reactions. In some cases it may not be possible or even desirable to administer sufficient treatment to secure permanent negativity on the part of serum reactions, but yet it is to be realized under these conditions that infection persists and to take the necessary therapeutic measures and precautions which are beyond the scope of the present discussion.

Indeed it would appear that syphilis is not being over-treated; rather it is to be feared that in many cases it is being under-treated and the public health laboratory can do a great deal in the prevention of this very regrettable error by employing a test or tests possessing the maximum of sensitiveness consistent with specificity and encouraging their use as serological guides in treatment.

With the large number of modifications of the Wassermann and the various precipitation tests now being advocated, I can well understand the perplexity experienced by public health laboratories in the choice of method or methods to be employed.

In some instances and especially during the present difficult financial conditions, a decision may be based more upon the necessity of exercising the strictest economy than upon scientific truth or the best service. This is right and proper if not pushed to the extent of seriously involving the questions of specificity and sensitiveness. Personally I believe that it is better not to employ the serum tests at all, but to rely upon clinical judgment alone in the diagnosis and treatment of syphilis, if the serum tests are lacking in a reasonable degree of accuracy and sensitiveness.

Without doubt the precipitation tests are more economical in materials since a hemolytic system is not required, but they are hardly more economical in time as compared with complement fixation tests and certainly require an equal degree of skill and experience for their conduct. Indeed my experience as a teacher of serology has indicated that physicians and technicians can be more readily trained to do a thoroughly reliable complement-fixation test than any of the precipitation tests with which I am familiar, and especially when it involves the matter of reading doubtful or weakly positive reactions. There can be no doubt about the importance of the latter; that is to say, a serum containing large amounts of antibody and yielding strongly positive reactions and one containing no antibody at all and yielding completely negative reactions offer no difficulties in reading and interpretation, but those containing small amounts of antibody and yielding weakly positive or doubtful reactions are the ones presenting most difficulty and are most subject to error and at the same time likely to be of most clinical importance and most urgently requiring the diagnostic aid of serum tests.

In many instances those interested in the precipitation tests have sought to produce one equal in sensitiveness to the Wassermann test, but with few exceptions have not taken the trouble to employ the better modifications of the Wassermann in making their comparative tests. Without doubt some of the better precipitation tests are more sensitive than the original Wassermann reaction and some of its modifications but this is not necessarily true when the complement-fixation test is conducted with a proper antigen and a prolonged primary incubation at a low temperature in the refrigerator.

It may be that circumstances compel the adoption of a precipitation test alone for the serum diagnosis of syphilis, but I believe that

a careful and impartial review of the situation amply confirms the prevalent opinion that the serum diagnosis of syphilis is still best served by employing both a complement-fixation and a precipitation method possessing the maximum of sensitiveness consistent with specificity. And if only one test can be done I believe that a complement-fixation test employing heated serum, a sensitive antigen, and an over-night primary incubation at 6 to 8° C. is still capable of yielding the more reliable reactions in the long run.

It is not within the province of this paper to discuss the mechanism of complement-fixation and precipitation reactions in syphilis with special reference to whether or not one or two kinds of antibody are involved, but certainly experience has shown that neither alone will detect as many cases of syphilis as the two together applied to each serum and that neither alone will exclude syphilis with as much accuracy as when both yield negative reactions. Indeed, during the past several years rather strenuous efforts have been made to displace the Wassermann test altogether in the serum diagnosis of syphilis by showing that this or that precipitation test is equal or superior in sensitiveness and specificity. But as previously stated a great deal of this work has been done with little regard for the kind of complement-fixation technic employed and the whole dismissed by employing a " Wassermann test " which may or may not have been acceptable and usually not employing a modification embracing a proper antigen of acceptable sensitiveness along with cold primary incubation.

I believe therefore that those public health laboratories aiming to give the maximum of service in the serological diagnosis of syphilis cannot escape at present the necessity of conducting a reliable modification of the Wassermann reaction possessing the maximum of sensitiveness consistent with specificity along with at least one of the more reliable of the large number of precipitation tests described from time to time during the past 25 years.

When both yield positive and when both yield negative reactions the evidence is much better and the results are more confidently reported upon than when but one test is employed. But the great difficulty is how to report and interpret the results when one test yields a positive and the second a negative reaction. And this difficulty is particularly apparent in public health laboratories far removed from personal contact with the physician and patient, and more especially when the former is not in position to give an expert and reliable clinical opinion for arriving at the best conclusion in relation to the welfare of the patient.

Fortunately the majority of reactions agree in so far as positive

or negative are concerned but a certain and inevitable percentage of disagreeing reactions can prove very disturbing. Under these circumstances one may surmise that the use of two precipitation procedures instead of one precipitation and one complement-fixation test may give greater uniformity in results and solve the difficulty while being more economical in that a hemolytic system is not required; but my experience with the Meinicke, Kahn and Kline precipitation tests indicates that this is not a solution at all, as these tests applied to the same sera give a higher percentage of disagreeing reactions than any one or two of the three employed along with my own modification of the Wassermann reaction.

Of course, an easy solution of this problem is to employ only one test on the assumption that if it is properly chosen and conducted the reactions will be accurate in at least 90 per cent of sera. Under these circumstances the choice must be a matter of individual preference and decision. Personally I prefer the quantitative complement-fixation test with a superior antigen and cold primary incubation as possessing an acceptable degree of sensitiveness, a higher practical specificity and a greater ease and accuracy in the reading of weakly positive reactions than any of the precipitation tests with which I am familiar.

But my custom during the past 7 years has been to use at least one precipitation test along with my own modification of the Wassermann test as better serving the purposes of serum diagnosis. My clinical experience in the diagnosis and treatment of syphilis invariably suffices for reaching a decision in private practice when the reactions are positive with one and negative with the other, and since a certain percentage of these disagreeing reactions is inevitable, I see no escape from the conclusion that public health and other laboratories seeking to render the best possible serum diagnosis of syphilis must employ both a complement-fixation and a precipitation test and leave the final decision up to the physician when the reactions disagree.

In this connection I may state, however, that differences in the degree of positiveness should not be allowed to be a disturbing factor. A strongly positive Wassermann reaction may occur with a weakly positive precipitation reaction or the reverse. The only thing that really counts is specificity or the reliability of the positive reactions without regard to the degree which is so largely at the mercy of technical factors. Furthermore there can never be a strict corelation between the degree of positiveness of either complement-fixation and precipitation tests and the clinical status of the individual patient since symptoms largely depend upon the physiological importance of the

tissues infected while the degree of positiveness largely depends upon the degree of spirochetic activity. For example, a case of locomotor ataxia may present pronounced signs and symptoms with but weakly positive reactions, whereas a case of concealed syphilis with a heavy infection involving an organ or tissue of lesser importance may be in excellent general health with strongly positive reactions.

In so far as a choice of precipitation tests is concerned from among the large number described by Sachs and Georgi, Dreyer, Vernes, Meinicke, Kahn, Hinton, Kline, and others are concerned, my own experience has been limited so far to those of Meinicke, Kahn and Kline, with special reference to the Kahn test, which I have been employing routinely as a control on my modification of the Wassermann test during the past 7 years.

I am particularly well impressed, however, with the new or more recent modification of the Meinicke generally designated as the "clarification reaction." In a comparative study made about 3 years ago by Dr. Elizabeth Yagle and myself we found that the reactions were more definite and easier to read and interpret than the reactions of the Kahn test. Furthermore the new Meinicke was more sensitive while possessing an equal degree of specificity.

For example, in 90 carefully chosen cases of syphilis the Meinicke test yielded 77, or 85 per cent, positive reactions, whereas the Kahn gave 56, or 73 per cent, positive reactions. With the sera of 62 non-syphilitic controls both tests yielded 4, or about 5 per cent, nonspecific or falsely positive reactions.

During the past year, however, I have been particularly interested in the Kline microscopic test and have had Dr. P. Menlowe, one of my graduate students, make a particularly careful comparative study of it with the Kahn and my modification of the Wassermann test, which were conducted separately and independently by Miss C. Richter. Dr. Menlowe had the advantage of some training under Dr. Kline and used the apparatus and antigen kindly furnished by him. The tests were done and the reactions recorded with no knowledge of the clinical diagnoses or the results of the Kahn and Kolmer reactions.

With the sera of 100 cases furnished from my own practice the reactions of all three tests agreed in 91 per cent and disagreed in 9 per cent of sera. In the case of the disagreements the results have been summarized by Dr. Menlowe as follows:

	Kline	*Kahn*	*Kolmer*
True positive reactions:	3%	4%	6%
Falsely positive reactions:	2%	1%	0
True negative reactions:	1%	2%	3%
Falsely negative reactions:	3%	3%	0

With the sera of 1,000 additional cases drawn from the hospital and out-patient clinics of the Graduate Hospital of the University of Pennsylvania with special reference to the clinic for dermatology and syphilology of Dr. Jay F. Schamberg, the results were as follows:

In 86.7 per cent of sera the reactions of all three tests agreed in so far as positive and negative were concerned while in 13.3 per cent they disagreed.

An analysis of the latter showed the following:

	Kline	*Kahn*	*Kolmer*
True positive reactions:	8.7%	6.6%	7.0%
Falsely positive reactions:	1.5%	1.4%	0
True negative reactions:	1.1%	1.2%	2.4%
Falsely negative reactions:	2.0%	4.1%	3.9%

In general terms the Kline microscopic precipitation test was definitely more sensitive than the Kahn test and slightly more sensitive than the Kolmer modification of the Wassermann test. On the other hand, however, the Kline also gave more nonspecific or falsely positive reactions than the Kahn, whereas the complement-fixation test did not give any falsely positive reactions.

It would appear therefore that the Kline test is somewhat too sensitive in its present state. Certainly it is more sensitive than my modification of the Wassermann reaction but, as previously stated, I prefer to lose a bit in sensitiveness if necessary in order to preserve intact the more important question of specificity.

This is also borne out by the results observed with the sera of controls. For example, tests conducted with the sera of 35 physicians and technicians of the laboratory staff, among whom the question of syphilis could be excluded with more than usual accuracy, the Kline test gave a weak falsely positive reaction with 1 while the Kahn and Kolmer reactions were completely negative with all.

With the sera of 25 cases of acute scarlet fever, the Kline gave apparently falsely positive reactions with 6, the Kahn with 1, while the Kolmer reaction was completely negative with all.

With the sera of 21 tuberculous women among whom it was believed that syphilis could be definitely excluded, the Kline gave 4 and the Kahn 3 apparently falsely positive reactions while the Kolmer-Wassermanns were negative with all. With the sera of 4 tuberculous women believed clincially to be syphilitic, the Kline and Kahn tests gave positive reactions with all while the Kolmer-Wassermann was positive with 3.

With the sera of a group of 17 diabetics believed to be free of syphilis, the reactions of all three tests were completely negative.

In so far as a choice between the Meinicke, Kahn and Kline precipitation procedures is concerned, I believe therefore that the new Meinicke clarification test is worthy of very serious consideration. If the Kline is employed it is almost certain to yield more sensitive reactions but with the drawback of being oversensitive with the consequent danger of yielding more falsely positive reactions. Much to my regret I am not able at present to express an opinion of the Hinton and Eagle tests, which I understand are well spoken of in some localities.

Certainly it would appear advisable at present to use at least one of these precipitation tests along with a Wassermann test of proven sensitiveness and specificity. The advantage of this practice is much better appreciated in individual cases than reflected in figures and percentages, as I well know from being in the unusual position of being actively engaged in both clinical syphilology and serology. While I appreciate that strenuous efforts have been and are being made completely to displace the Wassermann test, yet I am absolutely certain that this is not possible or advisable and that public health and other laboratories can best serve the serology of syphilis by employing the Wassermann along with at least one precipitation test.

SUMMARY

1. A choice of method or methods for the serum diagnosis of syphilis is a problem of special interest to public health laboratories.

2. Of particular importance to all laboratories and especially those engaged in public health work without the advantage of skilful clinical checking of reactions is the question of the specificity of weakly and unexpectedly positive reactions.

3. What is particularly required is the use of a test or tests possessing only the maximum of sensitiveness consistent with specificity in order to earn the confidence of the medical profession in the significance of weakly positive reactions.

4. By employing a test or tests possessing the maximum of sensitiveness consistent with specificity, public health laboratories can do a great deal in minimizing the regrettable error of insufficient treatment of syphilis.

5. Precipitation tests for syphilis are more economical than the Wassermann test since a hemolytic system is not required but they demand an equal degree of skill and one more subject to error and interpretation of weakly positive and doubtful reactions.

6. Not infrequently the various precipitation tests for syphilis have been compared with complement-fixation tests lacking in acceptable sensitiveness and specificity and consequently resulting in erroneous conclusions.

7. Despite strenuous efforts none of the precipitation tests can be said to have displaced complement-fixation tests possessing an acceptable degree of sensitiveness and specificity when judged impartially and scientifically with adequate clinical control. The use of two or more precipitation procedures has not proved as satisfactory as complement-fixation and precipitation tests of acceptable sensitiveness and specificity for the routine testing of sera.

8. It is impossible at present to make a choice of a single precipitation test from among the large number available.

9. The new Meinicke or "clarification" test has been found more sensitive than the Kahn test, of equal specificity and easier to read and interpret the reactions.

10. In a comparative study of the Kline microscopic and Kahn precipitation tests and the Kolmer modification of the Wassermann test, the reactions agreed in 86.7 per cent of over 1,000 sera and disagreed in 13.3 per cent.

11. In general terms the Kline microscope test was more sensitive than the Kahn and Kolmer tests but likewise gave a higher percentage of nonspecific or falsely positive reactions than the Kahn test while the Kolmer modification of the Wassermann test gave no falsely positive reactions.

12. At the present time the serum diagnosis of syphilis is best served by conducting a carefully chosen complement-fixation and precipitation test on each serum.

NOTE: Since the writing of this paper an excellent article by Dr. Lucy S. Heathman and Miss Margaret Higgenbotham on A Study of the Kolmer-Wassermann, Kahn and Kline Tests has appeared in the *American Journal of Syphilis*, 16:385, 1932. The authors concluded that the Kolmer and Kline tests appeared to be a more valuable combination than the Kolmer and Kahn, or the Kahn and Kline as tests for evidence of syphilitic infection. They also found that the Kolmer and Kline gave more positive reactions in congenital syphilis than did the Kahn test. These investigators likewise found that the Kline test, being more sensitive than the Kolmer and Kahn, also gave more positive reactions in cases considered to be non-syphilitic. If any public health laboratory adopts the principle that two tests should be carried out on the principle of employing one with a high degree of sensitiveness but less specificity and another with less sensitiveness but higher specificity, I agree with the authors that the Kline better serves the former and the Kolmer the latter purpose.

Courses on Maternal Hygiene in Italy

A DECREE of April 8, 1932, issued by the director of the National Bureau of Maternal and Child Welfare, provides for the establishment in all the universities of Italy of 1-month summer courses in prenatal and postnatal hygiene for the physicians assisting the directors of the various health centers and engaged in the teaching of hygiene to the mothers and children attending the centers. Similar courses are also to be established for those midwives who are employed by the health centers as health visitors in rural districts. These courses will be given under the supervision of the previously mentioned bureau.

Another decree orders that a special inspection of all infant asylums and receiving homes in Italy be made in May, 1932. A professor of pediatrics was appointed in each province to carry out the inspection. This special inspection is to be made in addition to the inspections that the National Bureau of Maternal and Child Welfare has been making at irregular intervals.

A circular was also issued by this bureau to its branches throughout the country prescribing the technic of air bathing, sea bathing, and sun bathing, giving a classification of cases for which the seashore, the mountains, or level country is advisable.—*Maternità ed Infanzia*, Rome, Apr., 1932.

An Appraisal Form for Industrial Health Service*

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WITH reference to the importance of health in industry, the late Thomas Edison, dean of American inventors and father of several world-wide industries, said:

> Coming generations of inventors will do their pioneering in the field of health. Electric light, telephone, radio, talking picture, automobile, air-plane—these things we have. What we have not is control over our own lives and bodies comparable to our control over material things. ... Sickness is pretty hard on the workman. ... There is too much sickness. ... Something will have to be done about it.

It is significant that many industrial organizations have set themselves to the task of doing something about health promotion and disease prevention among employees. Some companies, fully realizing the direct relation between health and efficiency of workers, already are engaged in many of the activities which might be suggested in an Appraisal Form, while others have yet to develop a well rounded health program; for the former an appraisal will be the means of satisfactory audit; for the latter, it will lay the groundwork for a more complete program in the future.

One industrial group already has gone on record as favoring the adoption of some means of rating the health activities of comparable units of its company as a most effective means of creating and sustaining interest, and suggests the formulation of a plan which would properly evaluate the constructive elements of a reasonable health program in industry. The writer has prepared an initial Health Appraisal Form which is an attempt to take the first steps in the development of such a plan. It is conceivable that it might be broadened to include all personnel and industrial relations activities if subsequently desirable, or abbreviated to cover only such activities as those of medical departments. A suggested outline of an Appraisal

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* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

Complete, detailed Form filed with the Chairman of the Committee on Administrative Practice, A.P.H.A.

Form for Personnel and Industrial Relations Service in general is given as an Appendix of the Form together with a Health Appraisal Form for smaller companies.

The Industrial Health Appraisal Form has been developed on the assumption that prevention and health protection, rather than curative medical treatment of accidents and industrial diseases, should dominate an industrial health service. In other words, industrial hygiene should include vastly more than emergency medical attention to specific occupational diseases, poisonings and accidents.

An Appraisal Form for Industrial Health Service does not mean to imply that all the suggested practices covered therein necessarily are desirable or feasible at this time in all organizations. The questions cover most of those things which might be included in a complete program for the larger companies. It is for the future to determine what should and can be done to meet local conditions and needs, especially of the smaller business concerns. This latter may be worked out best through local coördinating and assisting community agencies, such as state or local health or labor departments or associations.

THE NEED FOR MEASUREMENT OF INDUSTRIAL HEALTH SERVICE

The most important requirement at the present time for the further development and administration of industrial health programs is a plan or method for the measurement or appraisal of health activities. Such a plan would serve not only to evaluate but actually to promote industrial health services. While some industrial organizations have well organized health programs, much remains to be done by other companies in the development of a complete program.

There are so many factors entering into the problem of sickness, some of which are intangible and not, as yet, even remotely controllable, that it is difficult (if not impossible and wholly unfair) to judge the results of health administration or supervision, particularly in the industrial field, in terms of sickness rates alone or the amount of lost time due to sickness. The methods used in measuring the results of first aid and safety work are not well adapted to the appraisal of a health program.

In a positive health conservation program it is *performance or effort* in the development and administration of health activities (which taken as a whole eventually will result in reduced sickness) that should count, rather than the immediate decrease of sickness and time lost from work. The measurement of health work carried

on by an industry or by a particular area, division, district, or department in a company, should take into account the degree to which the company, or any unit of the company, has taken the necessary steps to protect and advance the health of employees.

The measurement of an industrial health program from the viewpoint of *total performance or company effort* presupposes and suggests the development of a so-called "Appraisal Form," " Rating Schedule," or " Record Booklet." The National Board of Fire Underwriters has developed such a form to assist cities in rating their fire protection services, and the American Public Health Association, American Child Health Association, and other public and community agencies have prepared forms to be used by states, cities, and counties in appraising their public health services. There is no apparent reason why such a practice and form should not be attempted by private and semi-public *industrial* organizations and their various departments and geographic divisions.

In the development of our preliminary and tentative form for industrial health appraisal, free use has been made of the experience, suggestions and published material of the above mentioned agencies, particularly of the National Board of Fire Underwriters and of the American Public Health Association, to which acknowledgment is made. Some of the major activities, standards, criteria and values in this industrial form have been set down tentatively and rather arbitrarily on the basis of those developed for the appraisal of city health work and of rural health work by the Committee on Administrative Practice of the American Public Health Association, on the assumption that industrial groups are nothing more than special working units of a community; and that industrial organizations, so far as possible, should fulfil their own share of obligations and responsibilities for community health and welfare.

A. OBJECTIVES

The objectives sought in the development of an Appraisal Form for Industrial Health Service are:

1. To obtain a picture of the extent or degree of organization and development of modern industrial health practice in a company or any unit of the same.
2. To serve as an instrument to promote, guide, interpret and measure health work in an industry or any of its units.
3. To arouse interest on the part of all company officials in the need for adequate health service in the industry; and to present those more directly in charge of the management of any unit with a tangible and concrete form of objective.

4. To provide stimulus for the development of a well balanced industrial health program, and to supply standard indices by which progress in health work may be followed by company personnel.

The purpose of such a measuring device at the moment is not to determine the quality or ultimate effectiveness of industrial health activities, but rather to show the extent and quantity of such work and to serve as an objective measurement to be used by personnel representatives, health supervisors, and other officials of business concerns in the inspection, appraisal or scoring of their own health activities, and the comparison and checking of the same from year to year. Indirectly, quality of work also would be measured to a considerable degree.

While such a rating schedule as suggested may be used in fostering the competitive spirit in health matters between various comparable units in a company, the chief use of such an Appraisal Form in the immediate future would be as a basis for comparison between what is and what should be in any given company or unit.

B. STANDARDS

It should be fully understood that the various criteria, standards and values used must be revised from time to time as conditions and practices change; but such changes should not be too rapid nor radical; otherwise it will become difficult to compare progress from year to year.

In general, the standards adopted for this Appraisal Form are far from being ideal, but have been set as high as practicable. The Form is in the nature of a scoring booklet and contains numerical values assigned to various activities in the industrial health promotion field. The rating for each activity is based partly on the health promotional value of each item in question, but more especially on the need for further development in industry of the particular activities noted.

C. CONTENTS OF FORM

The Form consists of various sections and subdivisions with their assigned values, as shown in Table I.

In the Form itself, not possible in this condensed paper, each of the subdivisions is further divided into various items or criteria which measure the amount of performance or frequency of practice, both of which are adapted to rather strict, impersonal quantitative measurement and can be assigned a definite quantitative number and value. To a lesser extent some of the activities are standard procedures

TABLE I

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED HEALTH APPRAISAL FORM FOR LARGE INDUSTRIES*

Sections and Subdivisions		*Assigned Values*
A. Vital Statistics Activities		75
1. Death Records	2	
2. Tabulation of Death Statistics	2	
3. Sickness and Accident Records	7	
4. Tabulation of Sickness and Accident Statistics	9	
5. Interpretation and Use of Statistics	55	
B. Communicable Disease Control		150
6. Records and Case Investigation	15	
7. Immunization	50	
8. Special Preventive Measures	70	
9. Public Relations	15	
C. Tuberculosis Control		100
10. Case Finding	17	
11. Medical Service	25	
12. Field Visiting	23	
13. Institutional Care	35	
D. Occupational Disease and Accident Control		200
14. Records, Case Investigations and Reports	30	
15. Medical Examinations	50	
16. Employees Brought to Professional Attention	30	
17. Laws and Regulations	20	
18. Inspection	40	
19. Education	30	
E. Personal and Environmental Hygiene of Office, Shop (Store), Factory and Outdoor Field Workers		400
20. Daily Inspection	10	
21. Periodic Inspection	10	
22. Field Visits	25	
23. Medical Examinations	100	
24. Employees Brought to Professional Attention	50	
25. Sanitation of Headquarters, Branch Office Buildings, Shops (Stores), Factories and Outdoor Working Environment	100	
26. Food and Milk Control	25	
27. Health and Safety Education	60	
28. Recreation and Rest Periods	20	
F. General Health Publicity		75
29. Articles in Company Magazines	35	
30. Health Bulletins and Reports	15	
31. Health Posters and Movies	20	
32. Special Health Publicity Activities	5	
Maximum Total Score		1,000

* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

which cannot be scored down; they either are or are not routinely performed and can have only a fixed number and value and given a full score or nothing. To arrive at a total score for a company, or any unit being appraised, the major section totals are added after

each one of the sub-items has been determined and added. At the end of the Form has been included an " Appraisal Summary " item by item, covering section and grand totals to be used for final scoring. More detailed instructions will be found in the Form itself under " General Directions for Use of the Industrial Health Appraisal Form."

As Appendices there are included a proposed brief Form for the use of smaller industries or business concerns, its contents being outlined in Table II; and a suggested Form for Personnel and Industrial Relations Service in general, outlined in Table III of this paper.

SURVEY QUESTIONNAIRE

Combined with the Appraisal Form is a suitable schedule or questionnaire for obtaining in proper sequence the fundamental data necessary and required for an intelligent appraisal of company health work. Thus the left-hand pages of the Form are given over to the so-called " Survey " containing questions and precise information in order that definite scoring can be made. On the right-hand pages

TABLE II

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED HEALTH APPRAISAL FORM FOR SMALLER INDUSTRIES AND BUSINESS CONCERNS*

Sections and Subdivisions		*Assigned Values*
A. Death, Sickness and Accident Records		15
1. Records Kept	5	
2. Records Used	10	
B. Sickness and Accident Prevention Measures		30
3. Investigation of Cases	7	
4. Sanitary Inspections	7	
5. Sanitary Supervision	6	
6. Specific Immunizations	3	
7. Safety Devices	5	
8. Examinations After Sickness	2	
C. Personal Health Promotion		40
9. Physical Examinations	10	
10. Periodic Examinations	5	
11. Correction of Defects	2	
12. Health Supervision	3	
13. Supervision of Occupational Injuries	5	
14. Medical Attention	5	
15. Health Education	10	
D. Public Relations		15
16. Compliance with Board of Health Regulations	5	
17. Compliance with Federal and State Laws	10	
Maximum Total Score		100

* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

the "Appraisal Form" itself is given, opposite the corresponding items in the "Survey Schedule," showing the standard values for the various items and containing columns for putting down the assigned scores. If it is desired not to use the right-hand page appraisal sheets, the left-hand pages may serve at least as an outline of a well rounded program.

D. COLLECTION OF DATA

It is assumed that it probably will take considerable time for Personnel Representatives or other officials of industrial companies to fill out the suggested Form, at least for the first time. Much of the information called for may never have been brought together under one head, by one department or person. Reference to and assistance from various departments and officials in a company may be required before the data can be assembled completely. When once the information and material have been brought together in concise form, and the "machinery" set up for gathering similar data from year to year, the task of periodic appraisal of company health activities and facilities should be fairly brief and simple.

PRELIMINARY TRIALS AND OPINIONS OF FORM

This survey and appraisal form has been used by one state-wide industrial organization, of about 4,000 employees, on a preliminary trial basis, and the vice-president in charge of personnel and public relations of this company makes the following comment:

> I like the plan immensely. It advances our health program and medical supervision very materially. In giving us a chart to guide this activity, we can plan our work with confidence and definiteness, confining our major effort into administration.

The personnel officer of another company employing about 10,000 men and women scattered over several states, says:

> I hope it will not be long before such a Form is officially adopted and published, because I feel there is a real need for it and that it will be most helpful in crystallizing management's views of the relative importance of various health activities. Also, it will be helpful to those of us who are undertaking to initiate and direct such activities, in measuring and comparing results by departments or areas.

PUBLICATION OF TENTATIVE FORM

Based on his past experience as a county health officer, and as a state health officer, as well as his active participation in city health administration, the writer is thoroughly convinced of the value of the

TABLE III

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED APPRAISAL FORM FOR PERSONNEL AND INDUSTRIAL RELATIONS SERVICE IN GENERAL*

Sections and Subdivisions		*Assigned Values*
A. Employment Activities		1,000
1. Routine Records and Statistics	150	
2. Selection of Employees	350	
3. Employee Introduction and Supervision	250	
4. Special Studies and Research	250	
B. Educational Activities		1,000
5. Company Training Courses or Conferences	400	
6. Outside School Relations	200	
7. Information and Publicity	300	
8. Special Activities	100	
C. Economic Activities		1,000
9. Provisions Against Risk	600	
10. Thrift	300	
11. Personal Services	100	
D. Health and Safety Activities		1,000
(See "An Appraisal Form for Industrial Health Service")		
E. Coöperative Activities		1,000
12. Employee Activities	250	
13. Management Activities	150	
14. Management and Employee Relations	400	
15. Company and Public Relations	200	
Maximum Total Score		5,000

* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

appraisal method not only in such public units as states, cities and counties, but also in semi-public and private industrial units; and he desires at this time to present this Appraisal Form in its preliminary and tentative state of development to the American Public Health Association with the suggestions: (1) that it be referred to the Committee on Administrative Practice, and with the tentative approval of the committee that it be published as a preliminary draft, for study and experimental use; and (2) that a new sub-committee on the Appraisal of Industrial Health Service of the Committee on Administrative Practice be appointed to follow and study the experimental use of the Form and possibly later, with the advice of other available experts in the field, to revise, standardize and adopt this or some similar Form. In view of the fact that such a Form would be particularly adapted to the use of large industries, an abbreviated Form, as outlined in Table II, also has been prepared for the experimental use of smaller companies and business concerns and might well be included as an appendix of the larger Form when published.

CONSULTING AND ADVISORY SERVICES FOR SURVEYS AND APPRAISALS

The suggestion also is made that if and when such a Form is available, the American Public Health Association might supply to large and small industries, on request, a consulting and advisory service on the Appraisal of Industrial Health Service, as has been done for the appraisal of health service in such public units as cities and counties. Such a consulting and advisory service ultimately might pay for itself through the stimulation of industrial group memberships in the American Public Health Association, which could offer and be made to cover these technical advisory services on industrial health appraisal.

COÖPERATION OF OTHER ASSOCIATIONS

Finally, in so far as the standardization and adoption of an Industrial Health Appraisal Form (with its special emphasis on sickness and accident prevention and health promotion) involve the technic of medical and surgical examination or treatment, it would be desirable for the American Public Health Association to seek the assistance and advice, if not the active coöperation and participation, of representatives of the American Medical Association, American Surgical Association and the Association of Industrial Physicians and Surgeons. Moreover, the coöperation of some such organization as the American Management Association, which includes representatives of the leading business concerns of the country, might be obtained to foster the Health Appraisal idea among industries just as the Chamber of Commerce of the United States has stimulated the Appraisal of Health Administration in American municipalities.

Sir Henry Acland

"ANY system of medicine which should ignore duty to the masses as well as to the individual is now no medicine at all; yet some here can recall the day when the prevention of disease was considered almost outside the province of an orthodox medical man."—Sir Henry Acland, President, General Medical Council, 1887. Quoted by Sir George Newman, *Brit. M. J.*, July 30, 1932.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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THE SIXTY-FIRST ANNUAL MEETING

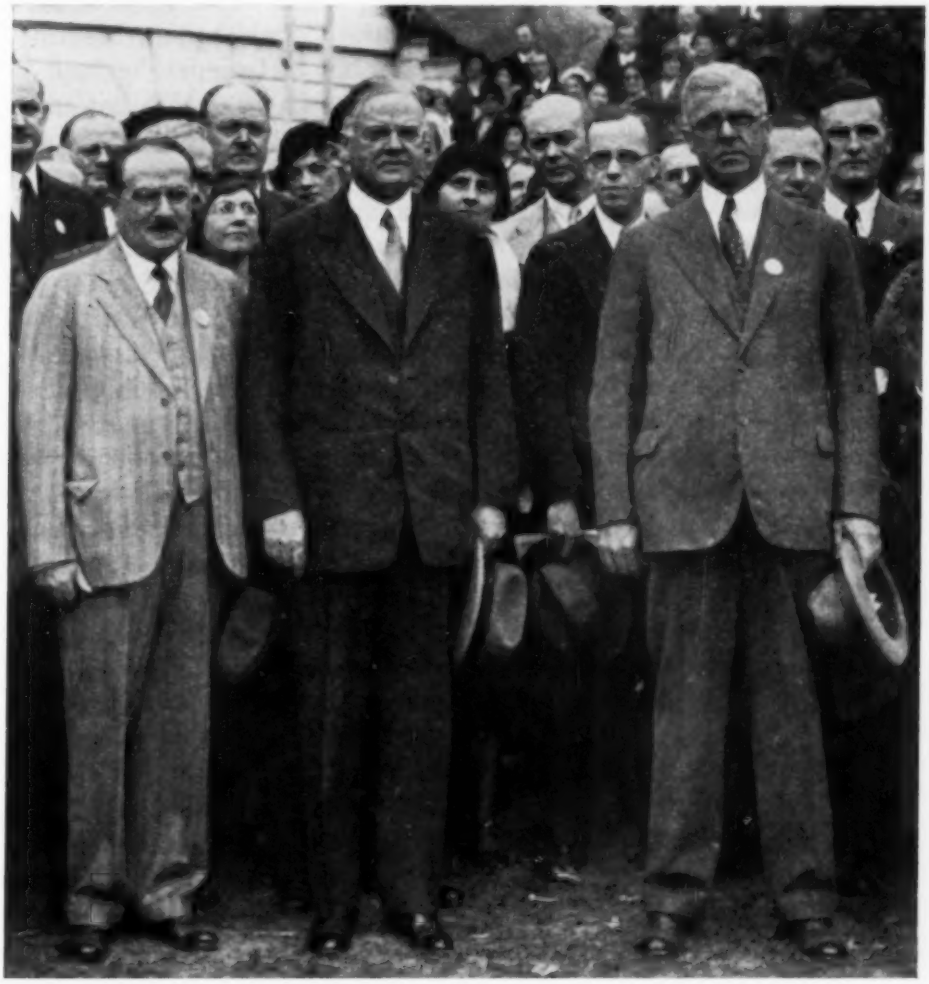
THE 61st Annual Meeting of the American Public Health Association has passed into history, but carries with it many pleasant memories for all of those who attended. The number of registered delegates was 1,233. Many people who attended only one or two sessions did not record their presence. Estimating their number on the basis of past experience, and including those actually registered, upwards of 1,600 were in attendance. It is interesting to direct attention to a statement by the convention manager of one of the large Washington hotels. He said the A.P.H.A. meeting was the only convention held in Washington in 18 months the attendance at which realized and exceeded the expectations. Other gatherings have been from thirty-five to fifty per cent below the estimate. The forecast for our meeting was 800 to 1,000, and the final figures are surprising and gratifying, particularly in view of the fact that travel expenditures in health department budgets have been so drastically cut. Many members of the Association travelled to the Annual Meeting at their own expense.

The Committee on Meetings and Publications struck two new notes—first, upwards of 100 new names were included as giving papers in our program, and second, a summary of work from the 10 different Sections was given in the Public Health Ten Star Final. We believe that including new names should add to our membership and increase the interest of old members, although we have on our program always

a number of tried and true stand-bys, particularly on our various committees, who give us the substance of what has been done in their various branches during the year which has elapsed since our last meeting.

The Laboratory Section had by far the greatest number of papers, so much so that it will be impossible for us to give all of them to our readers in the pages of the JOURNAL. Almost every subject of interest to laboratory workers was considered.

At the first General Session, which was largely attended, President Hoover gave a short address. Following this, the President of the Association summed up the situation in the country as regards health, and also the condition of the Association itself. It was an encouraging summary, showing that in spite of the depression, the health of the



Dr. Dublin, President Hoover, and Dr. Ferrell at the reception on the White House lawn

country has never been better, but he uttered a very sound warning against being too optimistic, since there is no doubt in the minds of practically all health workers that the effects of the depression, both physical and mental, will show themselves sooner or later.

The Association itself is in a healthy condition. The number of Life Members has been doubled during the year and losses have been made up, so that the membership roll is now at its peak. However, the budget has been hit and all salaries have been reduced. The President paid a deserved tribute to the workers on the cheerful way in which they have accepted the situation, including the pay cuts, and continued their work with the highest degree of enthusiasm and efficiency. There has been no let-down in the morale.

At the Montreal meeting in 1931, it was considered possible to enlarge the JOURNAL by 20 pages a month, which would have taken a tremendous burden off the shoulders of the Committee on Meetings and Publications, and especially the editors. However, instead of the increase, we have during the year lost 64 pages, which has made it necessary to return even papers already prepared for the printer, and for which prompt publication was confidently expected.

We have already said that the program was excellent in all respects and it may seem invidious to pick from it certain sections which seemed to attract especial attention. The first General Session was followed by a reception which was largely attended. On Wednesday morning, a symposium on milks and their especial antirachitic value, their development and use, attracted much attention, not only on account of the recognition of the importance of foods in general and milk in particular, and their discussion in journals, scientific as well as lay, but also on account of the high standing of those who took part. At 12:30 those who desired to do so went to the White House lawn where Mr. Hoover received them and a photograph of the group was made. At 1 o'clock, a special luncheon session on diphtheria prevention was held, which also claimed a very large attendance. At 2:30 one of the new features, the Ten Star Final, was held in the large ballroom. In spite of the fact that 800 chairs had been provided, there were many standing. It was the opinion of those who attended that under one name or another such a summary of the activities of the Association, and of the condition of the sciences dealt with by our 10 sections, should be a feature of future meetings.

Washington was at its loveliest. The local committee had done everything possible for the comfort and enjoyment of the guests. Excursions were provided, free of expense, to the National Institute

of Health, the Surgeon General's Library, Walter Reed Hospital, Sewage Disposal Plant, and many other places of interest. Altogether, the meeting at Washington may be put down as a success which will long be remembered by members of the Association.

RAW VS. HEATED MILK

STRANGE as it may seem to those of us who have studied the pasteurization question and who believe in it, there is still agitation in favor of raw milk and allegations are made that the heating of milk destroys to a certain extent its nutritive value. There is also an association in the United States devoted to pushing the use of raw milk. Some of its agents are making the claim that pasteurization is injurious.

The report in 1931 from the National Institute for Research in Dairying [1,2] was quite disconcerting, as it apparently showed that, as far as rats were concerned, milk pasteurized at 145–150° F. for ½ hour and milk heated to 210–212° F. for ½ hour gave evidence of a lack of certain nutritive factors as evidenced by reproduction. Animals fed on raw and pasteurized milk, plus biscuit made of white flour and water, grow and reproduce normally, while in those fed on sterilized milk, plus the biscuit, reproduction failed, and of the original rats, many failed to reach maturity. As far as this part of the experiment goes, it demonstrates only injury to the vitamin concerned in reproduction, but the report further states that there were visible differences in the rats even in the first generation, always in favor of raw and to the great disadvantage of sterilized milk. The difference between the effects of pasteurized and sterilized milk in these experiments must be noted, in spite of the general conclusions reached, that heating injured the nutritive value of milk. During 5 years of study, the authors state while animals thrived on milk for a considerable time, never before have they been able to continue feeding beyond the fourth generation on an almost exclusively milk diet.

In view of this situation, the report from the U. S. Public Health Service of a group of workers headed by Leslie C. Frank [3] is reassuring, and of great value in the campaign which is going on everywhere for the pasteurization of market milk. Studies on children fed raw and heated milk plus the supplementary diet received by the average American child between 10 months and 6 years of age have been carried on in 39 cities situated in 10 states. The number of children covered was 3,700, and the general conclusion reached was:

The growth-promoting capacity of heated milk plus the supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth-promoting capacity of raw milk plus the supplementary diet received by the average American child of 10 months to 6 years.

Further analysis of the general results shows that there were 32 cases of diphtheria among 1,875 children who received heated milk only against 40 among the 1,762 children fed predominantly on raw milk, case rates of 17.1 and 22.7 per 1,000, respectively. For scarlet fever, the group fed on heated milk showed 43 cases against 73 for the raw milk group, case rates of 23.0 and 41.4 per 1,000, respectively.

Intestinal disturbances reported under such names as diarrhea, dysentery, flux, colitis, and summer complaint, amounted to 426 for the group fed on heated milk against 491 for those fed on raw milk, case rates of 227.0 and 278.0 per 1,000, respectively. Excluding diarrhea, which the authors of the report believe includes many mild cases not caused by milk, the cases of intestinal diseases amount to 208 for those fed on heated milk and 395 for those fed on raw milk, case rates of 111.0 and 196.0 per 1,000. For those fed on heated milk there were 59 cases of rickets against 90 in the raw milk group, case rates of 31.5 and 51.1 per 1,000, respectively. It was found that among those fed on heated milk predominantly, more were given cod liver oil.

The average weight of the children in the two groups differed insignificantly, being 33.6 for the heated milk group and 33.2 for the raw. The same statement applies to average height, being respectively 37.5 and 37.4 inches. The supplementary diet of the 2 groups was very much the same, except for cod liver oil which was given during an average of 41.6 per cent of the lives of children fed heated milk, and only 27.6 per cent of the lives of those fed raw milk. The average weight of 636 children fed on heated milk who received no cod liver oil was 33.5 pounds as compared with 33.8 pounds for 794 children of the same group who received cod liver oil during more than half of their lives, indicating that the percentage of life during which cod liver oil was fed did not affect the relative position of the 2 age-weight curves to any extent. It is apparent also that the children who were fed raw milk predominantly had a higher incidence of diphtheria, scarlet fever, intestinal disturbances, and rickets than those receiving heated milk only.

This report does not consider tuberculosis, but we have evidence from New York City particularly, where 98 per cent of the milk is pasteurized, that the incidence of bovine tuberculosis in children has dropped enormously. This decrease in tuberculosis of human origin

among infants is noted also. In view of these facts, taken with those now presented, the advocates of pasteurization can go ahead with a clear conscience in their work, feeling assured that they are not in any way injuring the health prospects of children, but are, on the other hand, protecting them against tuberculosis, intestinal disorders, and all other diseases which are transmitted through milk.

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3. Frank, Leslie C., et al. Do children who drink raw milk thrive better than children who drink heated milk? *Pub. Health Rep.*, Sept. 23, 1932.

IS THE REGISTERED INCREASE OF HEART DISEASE REAL OR APPARENT?

AN interesting and timely paper [1] discusses the alleged "appalling increase" in heart disease. The writers acknowledge that the number of deaths charged to the cardio-arterio-renal system is enormous and constitutes one of the new and important health problems. This opinion will be accepted by all who have studied the question. They point out, however, that in spite of this alleged rapid increase, they know of no extensive or well planned study to determine its causes or to establish control measures. In place of this, there is a good deal of talk about the pace of modern living and other similar phrases which mean little or nothing. As they express it, there is a wealth of opinion but little real scientific evidence. Their own study is devoted entirely to the mortality statistics of New York City. They have analyzed the basic data as given in the death certificates and have pointed out the sources of errors. They point out also—what is well known to all pathologists—that the pathological changes and etiological factors of heart disease are not to be limited to the heart itself, but include also the arteries and kidneys, from which fact the term cardio-arterio-renal system has evolved.

In New York City, the registered increase in heart disease is admitted, but there is shown to be a fairly corresponding decrease in apoplexy, Bright's disease, and deaths from senility. The authors hold that the registered rise in death rate from heart disease is largely, if not wholly, fictitious, and that statistics based on these alone are fallacious, since those assigned to apoplexy, arterial and kidney diseases, and senility must be taken into account. They point out further that for the registration area of the country as well as for New York City, the specific death rates, even in the higher age group, have declined since the beginning of this century, a fact which they find it

hard to reconcile with any considerable increase in the mortality from heart disease.

There seems to be little doubt that the group of diseases classified under cardio-arterio-renal, which often goes under the name of heart disease, is more common now than it was 30 years ago. It is possible that there are changes in the incidence independent of the increased age level of the population, but so far, no one has been able to prove this. Some pathologists hold, apparently justly, that the increase is in part real, giving as possible factors which may be concerned as items under etiology—sex, age, occupation, habits, previous disease, acute or chronic infections, especially of the lungs such as those following influenza, which affected such a large population of the country during the epidemic of that disease which occurred from 1918 to 1923. Further than this, there is a possibility that the inheritance of a poor cardio-arterio-renal system may play some part, but there is no ground for considering this too seriously.

Of real significance must be considered the alcoholic beverages which are now taken. These have long been assigned as a cause of heart-blood-vessel-kidney disease. If it is a fact that alcohol does play such a part in this group of diseases here in America since prohibition came in, we have gone the limit in the use of hootch and other raw alcoholic beverages into which poisonous products, due to rapid distillation, imperfect fermentation, etc., may have passed.

The paper is worthy of the consideration of all interested in preventive medicine and it is to be hoped that the pathologists and the statisticians of the country will join hands in an effort to determine the truth and to propose remedies which may be put into effect by our health authorities.

REFERENCE

1. Bolduan, Charles F., and Bolduan, Nils W. Is the "appalling increase" in heart disease real? *J. Prev. Med.*, 6:4 (July), 1932.

SIR RONALD ROSS

SIR Ronald Ross died on September 16 at his home in Putney, England, at the age of 75 years. He is one of the men who has written his name indelibly in medical annals, owing to his discovery that the Anopheles mosquito carries malaria, and of the method by which this is accomplished. Unfortunately, a bitter controversy arose over the credit for this, which we believe belongs practically entirely to Sir Ronald Ross. Those in charge of the awarding of the Nobel Prize in Medicine certainly had the same opinion, as this prize was given to him in 1902 on account of his discovery. The clinching

argument has always been a poem which he wrote on the day his discovery was made: "I know this little thing a myriad men will save." This shows that he realized not only that he had made a discovery, but also what it meant to the world. He had the good fortune to live long enough to see his ideas put into effect and to see malaria brought under control in many parts of the world. There is little question that if malaria was as deadly a disease as yellow fever, the control of it would be more perfect, since abundant funds would be available for the work.

Sir Ronald Ross was born at Almora, India, the son of General Sir Campbell Claye Grant Ross. He obtained his medical education in England and entered the Indian Medical Service in 1881. There is little question that he owed his inspiration to follow the line of work in which he made this great discovery to Sir Patrick Manson. Laveran had discovered the germ of malaria and had even forecast the mosquito conveyance, but did not prove it. Sir Ronald overcame what would have been insuperable difficulties to others. The authorities interrupted his work several times and did not seem to see the value of it, though at the time there were more than a million deaths every year from malaria in India. During the World War he lost his son in one of the early drives. He served as consultant in malaria to the War Office, and later held a similar position in the Ministry of Pensions.

Many honors were paid him and degrees given to him, but pecuniary assistance did not follow to any great extent. He was the founder of the Ross Institute and Hospital for Tropical Diseases, but toward the end of his life was very hard put to it for a living.

He has been described as a "many sided genius." In addition to his scientific work he wrote poetry, novels, and five mathematical works, which his latest biographer, R. L. Megroz, feels have not received sufficient recognition. He had many friends in America.

Few men have made discoveries of more value to the human race, and his name will always be honored by all public health workers as well as all members of the medical profession.

ASSOCIATION NEWS

DR. JOHN A. FERRELL, PRESIDENT A.P.H.A.

John A. Ferrell, M.D.
President, A.P.H.A.

DURING the past year the office of President of the Association has been filled ably and acceptably by Louis I. Dublin, Ph.D. The year has been a trying one and he has successfully met problems more difficult than most presidents have to face. We will still have his wise counsel as a member of the Executive Board. We are fortunate in his successor, John A. Ferrell, M.D., Director of the International Health Board of the Rockefeller Foundation, who has served in the capacity of President-Elect of the American Public Health Association since the last Annual Meeting in Montreal. His work is well known to sanitarians from the time he joined the Rockefeller Sanitary Commission in 1910. He was first in charge of the Commission's Work in North Carolina directing an educational campaign against hookworm. When the Rockefeller Sanitary Commission became the International Health Board with a world-wide program, Dr. Ferrell was made Director for the United States.

DR. HAVEN EMERSON, PRESIDENT-ELECT A.P.H.A.

HAVEN Emerson, M.D., of New York, President-Elect of the American Public Health Association, received his A.B. degree from Harvard and his medical education from the College of Physicians and Surgeons of Columbia University, graduating in 1899. After 2 years of interneship at Bellevue Hospital he entered general practice of medicine in which he continued for 15 years, during which he was successively demonstrator and associate in Physiology and associate in Physical Diagnosis at the College of Physicians and Surgeons.

In 1914 he was appointed Sanitary Superintendent and Deputy Commissioner of Health to New York City. In 1915 he succeeded Dr. Goldwater as Commissioner of Health. From Janu-

ary, 1918, to June, 1919, as Major, Lieutenant-Colonel, and Colonel in the Medical Corps of the Army, Dr. Emerson held the position of Epidemiologist of the American Expeditionary Forces in France. During 1920 and 1921 he served as Professor of Preventive Medicine and Hygiene at Cornell University, Ithaca, N. Y., and during that time, directed the Cleveland Health and Hospital Survey. In 1921–1922, he was the Medical Adviser of the Veterans' Bureau. Since 1922, Dr. Emerson has been Professor of Public Health Practice and Executive Officer of the DeLamar Institute of Public Health at the College of Physicians and Surgeons of Columbia University. He has carried out directly, or in collaboration with others, a number of health and hospital surveys of American cities, and the survey of the health and medical facilities of the city of Athens, Greece, for the Health Section of the League of Nations.

Dr. Emerson received the Médaille d'Epidémie en vermeille, was decorated as Chevalier of the Legion of Honor by the Republic of France, and received the Distinguished Service Medal from the United States Government. He is a member of the National Advisory Health Council of the National Institute of Health.

Haven Emerson, M.D.
President-Elect, A.P.H.A.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.

Health Officers Section

George W. Bushong, M.D., Tompkinsville, Ky., Director, Monroe County Health Department

John F. Cadden, M.D., Calhoun, Ky., Health Officer, McLean County

Dr. F. W. Caudill, Georgetown, Ky., Director, Scott County Health Department

Taylor Center, M.D., Campton, Ky., Health Officer

Lewis C. Coleman, M.D., 2904 Reisterstown Rd., Baltimore, Md., Madison County Health Officer

Leonard A. Crosby, M.D., Williamsburg, Ky., Director, Whitley County Health Department

Joseph W. Davis, M.D., 204 S. Wells St., Sistersville, W. Va., Director, Mobile Unit No. 2

Rosier D. Dedwylder, M.D., Cleveland, Miss., Director, Bolivar County Health Department

John W. Dukes, Hindman, Ky., Director, Department of Health

E. E. Edwards, M.D., 422 S. Main St., Taylor, Pa., Health Officer

G. W. Fishbaugh, M.D., Court House 303, Portsmouth, O., Health Commissioner

Lynn M. Garner, M.D., Tuscumbia, Mo., Director, Miller County Health Department

Marshall C. Guthrie, M.D., 15 E. Taylor St., Chevy Chase, Md., Medical Director, U. S. Public Health Service

Thomas J. LaMotte, M.D., Box 314, Elkton, Ky., County Health Officer, Todd County

Hugh L. McCalip, M.D., Yazoo City, Miss., Director, Yazoo County Health Department

Thomas J. Pool, M.D., Ola, Ark., Field Agent, U. S. Public Health Service, Medical Director, Yell County Health Unit

Thomas N. V. Potts, M.D., D.P.H., Public Health Dept., County Hall, Wakefield, England, County Medical Officer and School Medical Officer (Assoc.)

Walter F. Stillger, M.D., Professional Bldg., Hicksville, N. Y., Health Officer, Oyster Bay

Albert B. Tonkin, M.D., Riverton, Wyo., President, State Board of Health

Milton W. Williamson, M.D., Greensburg, Ky., Director, Green County Health Department

Laboratory Section

Winifred M. Ashby, Ph.D., 419 4th St. N.W., Washington, D. C., Bacteriologist, St. Elizabeths Hospital

Lucius F. Badger, M.D., National Institute of Health, Washington, D. C., Commissioned Officer, U. S. Public Health Service

Henry A. Cotton, M.D., N. J. State Hospital, Trenton, N. J., Director of Laboratory Research in Mental Disorders

Walter LeRoy Mallmann, Ph.D., Department of Bacteriology, Michigan State College, East Lansing, Mich., Sanitary Bacteriologist

Herbert E. McDaniels, B.S., 6536 Emerald Ave., Chicago, Ill., Bacteriologist, State Department of Public Health

Mrs. Betty Morris, Hinton, W. Va., Clinical Laboratory Worker (private hospital)

John E. Noble, Rm. 200, District Bldg., Washington, D. C., Bacteriologist

Isadore Pilot, M.D., 185 N. Wabash Ave., Chicago, Ill., Associate Professor of Pathology and Bacteriology, University of Illinois, College of Medicine

Anni Seppanen, M.D., Helsinki Eerikinkatu I, Finland, School Physician (Assoc.)

George W. Wheeler, M.D., 525 E. 68th St., New York, N. Y., Assistant Professor of Applied Bacteriology, Cornell University Medical College

Vital Statistics Section

John H. Milligan, P. O. Box 87, West Falls Church, Va., Chief, Bureau of Vital Statistics, Health Department, Washington, D. C.

Hugo Muench, Jr., M.D., Dr.P.H., Rockefeller Foundation, New York, N. Y., Field Staff

Jessamine S. Whitney, A.B., 164–16 Cryder's Lane, Beechhurst, L. I., N. Y., Statistician, National Tuberculosis Association

Public Health Engineering Section

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Lewis V. Carpenter, Box 562, Morgantown, W. Va., Professor, Civil and Sanitary Engineering

Ross E. Garrett, B.S., 501 Carlson Bldg., Pocatello, Idaho, City Public Health Engineer

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Edward O. Madison, Lebanon, Tenn., County Sanitary Officer

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Arthur D. Weston, 15 Blackstone Terrace, Newton, Mass., Chief Engineer and Director Division of Sanitary Engineering, State Dept. of Public Health

Industrial Hygiene Section

Waldemar C. Dreessen, M.D., U. S. Public Health Service, Washington, D. C., Asst. Surgeon

James E. Ives, Ph.D., U. S. Public Health Service, Washington, D. C., Senior Physicist

Edward S. McSweeny, M.D., D.P.H., N. Y. Telephone Co., 140 West St., New York, N. Y., Medical Director

Louis Schwartz, M.D., U. S. Public Health Service, New York, N. Y., Studies of Industrial Dermatoses

Food and Nutrition Section

Reid R. Ashworth, D.V.S., 3533 Hertford Pl. N.W., Washington, D. C., Chief Food and Dairy Farm Inspector

Frederic H. Bartlett, M.D., 108 E. 79 St., New York, N. Y. (Assoc.)

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Child Hygiene Section

Dr. H. S. Berman, 10 Peterboro, Detroit, Mich., formerly with Infant Welfare Department, Detroit Department of Health

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L. M. Merrow, M.D., 720 Market St., Mechanicsburg, Pa., formerly with State Health Department

Charlotte R. Rader, M.D., Laramie, Wyo., Director of Health Work, Public Schools

Frances C. Rothert, M.D., U. S. Children's Bureau, Washington, D. C., Associate Medical Officer

Dr. Marion Stevenson, Houghton, Mich., Ophthalmologist, Children's Fund of Michigan

Joseph S. Wall, M.D., 1864 Wyoming Ave., Washington, D. C., former Director, Child Welfare Society

Public Health Education Section

Aurelia B. Cote, B.S., Seaford, Del., Director of Health Education, Public Schools

Nora S. Hamner, R.N., 1112 Capitol St., Richmond, Va., Executive Secretary, Richmond Tuberculosis Association

H. Mae Hindman, R.N., Palo Alto Hospital, Palo Alto, Calif., Superintendent

Mrs. M. Pierson, B.S., 110 E. 14 St., Austin, Tex., Assistant Secretary and Treasurer, Texas Public Health Association

Charles M. Smith, M.D., Box 107, Dixon, Ky., Director, Webster County Health Department

Emma Stewart, B.A., 821 E. Washington St., Ann Arbor, Mich. (Assoc.)

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Public Health Nursing Section

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Charles Armstrong, M.D., 1001 Ohio St. N.E., Washington, D. C., Surgeon, U. S. Public Health Service

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Unaffiliated

Joseph H. Kler, M.D., Rutgers University, New Brunswick, N. J., University Physician

Herbert C. Ober, M.D., DMD., 38 Eldridge St., Newton, Mass., Industrial Medicine, Hood Rubber Co. Inc.

APPLICANT FOR FELLOWSHIP

HEALTH OFFICERS' SECTION—

R. H. Markwith, M.D., Commissioner of Health, Summit County, Akron, O.

TRAINING AND PERSONNEL

REGISTRATION OF HEALTH OFFICERS AND ASSISTANT HEALTH OFFICERS

IN January, the Association will publish a Directory of Health Officers and Assistant Health Officers. This will be used in connection with the national movement to provide tenure of office for existing health officers and the appointment of experienced or trained health officers when new appointments are to be made.

If you are a health officer or assistant health officer, and have held such a position for 2 years or more and have not been out of the public health field for more than 2 years, your name should be on this list. Fill out and send to the Association the blank sent to you last spring, or if you have not received such a blank, write for one.

LETTER FROM GREAT BRITAIN

A MEMORIAL TO THE LATE SIR ANDREW BALFOUR

THE ceremony of unveiling the memorial to the late Sir Andrew Balfour on October 6 was one of the most brilliant and largely attended that the London School of Hygiene and Tropical Medicine has seen. This was not surprising, for in the medical profession there are few who have had so many and such varied interests as Balfour, and none who has attained so high a place and earned so much of esteem and regard in each of his interests. From the fields of nearly all of his activities there were representatives met together to hear and express agreement with the glowing tribute paid to the memory of Sir Andrew by the Earl of Athlone, Chancellor of the University of London.

As explained by Sir Holburt Waring, of the Court of Governors, the suggestion that there should be a memorial to Andrew Balfour was very warmly welcomed by a very wide circle of his friends, and within the space of a comparatively few months a sum of over £2,000 ($8,000–9,000) had been subscribed or promised. The greater part of this sum is to be devoted to the purpose of enabling students, preferably from overeas, to pursue courses of study in the School. The remainder was used to provide and erect a tablet to the memory of Sir Andrew Balfour in the entrance hall of the School. No one connected with that institution, for which London University is indebted to the Trustees of the Rockefeller Fund, is more deserving of such recognition as a tablet can offer than Andrew Balfour. It was the last piece of work to which he put his mind and that, as the Chancellor said, he "brought to fruition, through 7 years of unremitting zeal, untiring energy, and an enthusiasm —nay, a passion— for the successful accomplishment of his task."

The very many friends he had in preventive medical and teaching circles in the United States of America will agree that there could be no description of Andrew Balfour from which the words zeal, energy, and enthusiasm could rightly be omitted. He was a tremendous worker, no matter where he was or what he did. Everywhere, and there was apparently no part of the globe where he did not work, and whatever the kind of it, all of it was inspired by zeal, energy and enthusiasm.

All of the greatness he attained—and I have thought often, knowing him intimately, that no one except Balfour himself, the most modest of men, was surprised at that greatness—came to him because of these three things. Also, and without doubt, they brought his life to his pathetic and untimely end at the early age of 58, for if it could be said of anyone at any time that he worked himself to death it could be said of Balfour. In the interests of the London School of Hygiene and Tropical Medicine and of the British Empire, if not, indeed, of the nations of the world, he worked and worried himself to death. With his passing there went out, as the Earl of Athlone described him, a man without guile, honest to the core, and one who evoked in his colleagues a spirit of love and sacrifice.

It is good that there should be in the hall of the School a permanent record of his devotion to the cause of tropical hygiene and of his self-sacrificing labors on behalf of the school. More appropriate still is it that, having regard to what he was and did, and for the encouragement of others also, there should

be upon the tablet these noble words of Walt Whitman: "Through the battle, through defeat, moving yet, and never stopping. Pioneers! O Pioneers!"

PROFESSOR CARL PRAUSNITZ AND THE TEACHING OF PREVENTIVE MEDICINE

OCTOBER with us always is a month of addresses, but never have I known one more replete with oratory than this one has been. The medical schools, which open in October, began it, each, in London at any rate, calling up someone more or less distinguished to tell the students just how wonderful a career they have chosen and to give a talk upon some subject he is particularly interested in. As the occasion is usually also that of the annual prize giving, and the students who have gained awards at any rate are bound to attend, the meeting is in general very pleasant and nice and in the main decorous.

Close on the heels of these school orations there have followed this October a multitude of others many of them upon preventive medical subjects and therefore of particular interest to members of the health service. Of outstanding importance have been the Heath-Clark Lectures of Professor Carl Prausnitz of Jena, and the Harveian Oration to the Royal College of Physicians of Sir George Newman, Chief Medical Officer of the Ministry of Health. As the first Heath-Clark lecturer—the course was only inaugurated last year—Sir George Newman took the chair at the first of Professor Prausnitz's lectures and presented him to the audience in the lecture theatre at the London School of Hygiene and Tropical Medicine. Not, as Sir George explained, that much in the way of introduction was necessary since, apart from the fact that he is known by his work, Carl Prausnitz attended school in England, studied for an English medical qualification in London, and held certain teaching and laboratory appointments before taking up work in Jena. As a result there was no language difficulty and when he addressed us it was as if we listened to one of our own university professors delivering a lecture. In his course Professor Prausnitz discussed "The Teaching of Preventive Medicine in Europe," and gave us the results not only of a very full investigation he had carried out in various schools in various countries but also of very serious consideration given to the whole subject. From the view submitted it was clear that considerable differences and divergencies exist, and that in every country some sort of attempt is being made to get the teaching placed on a sound and broad basis.

In this country, largely on the initiative of Sir George Newman, who some years ago issued a special report on the need for teaching preventive medicine in the medical schools and the methods that might be adopted, and more recently as a result of pressure brought to bear by the Society of Medical Officers of Health, the attention of the General Medical Council, the medical schools and examining bodies has been directed to the matter. The results that have followed the directing of this attention unfortunately leave much to be desired. The hope is nourished, however, that this visit of Professor Carl Prausnitz and the lectures he has delivered may have the effect of impressing upon the bodies mentioned, and more especially the teaching staffs of the medical schools in London and elsewhere, the need for recognizing more fully the great importance that should be given to preventive medicine in the medical curriculum.

THE HARVEIAN ORATION OF SIR GEORGE NEWMAN

THOUGH the Harveian Oration has been delivered more or less continuously year by year on St. Luke's

Day since the inauguration of the feast by Sir William Harvey in 1656 in commemoration of benefactors of the Royal College of Physicians, of which he was a Fellow, not many of the orators have been engaged in the public health and preventive medical service. Even so it is doubtful if any had such claims to speak of preventive medicine or to be regarded as an orator as Sir George Newman. In choosing to speak of the advances made within the past century in the prevention and control of disease, Sir George provided himself with an opportunity of paying tribute to many benefactors not only of the College of Physicians but of mankind as a whole. Also he provided a treat for those privileged to be present in the beautiful library of the College, for when it comes to medical history Sir George is particularly apt to prove interesting to the point of fascination. On this occasion he certainly gripped his hearers, and had the surroundings been other than they were there might have been marked expressions of enthusiasm. However, it is difficult to be other than supremely conscious of a need for decorum when you find yourself surrounded by ceremony that smacks of the 17th century, and by a collection of distinguished physicians all in scarlet robes, with Lord Dawson of Penn clad in a robe of black and gold in his place as President and with the golden mace resting upon its cushion before him.

By ancient custom the whole business of this meeting should be the oration, and at its end the President should depart in procession accompanied by the high officers and councillors. On this occasion there was a departure from the established order to permit of reference to the loss sustained by the death of Dr. T. H. C. Stevenson, Superintendent of Statistics in the office of the Registrar-General, to whom there had been awarded, but not presented on account of the illness that had proved fatal, one of the medals (the Bisset Hawkins Gold Medal) in the gift of the college. St. Luke's Day is a very full one for the Royal College of Physicians for, in addition to listening to the oration in the afternoon, they attended church in the forenoon to hear the Dame Sadleir Sermon and in the evening took part in a banquet. And so to bed. CHARLES PORTER, M.D.

London

Members and subscribers are requested to send notification of any change of address to the office of the Association as promptly as possible.

PUBLIC HEALTH ADMINISTRATION

SHORT SCHOOLS FOR MILK CONTROL OFFICIALS

SARAH VANCE DUGAN

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Louisville, Ky.

IN order to develop uniform procedures and improve methods of milk supervision in the State of Kentucky, the State Board of Health conducted in different sections of the state during August, 1932, three schools of instruction, each of 3 days' duration. One school, at Henderson, included the full-time health officers and inspectors of 11 counties; the sessions at Murray included the personnel of 7 counties; while those at Georgetown included the personnel of 12 counties.

Each school was located where space was available for the travel laboratory equipment loaned by the American Child Health Association and for a classroom for lectures and demonstrations. Lectures were given by representatives of the U. S. Public Health Service, the American Child Health Association, and the State Board of Health. After the lectures dealing with special aspects of milk control, the class was divided each day into groups for dairy farm or milk plant inspections, for collection of route samples, or for laboratory demonstrations. The course covered safe water supply and waste disposal methods, including construction of practical toilets in rural areas.

Certificates were awarded to those who attended all the sessions of the course. Opportunity was given for free discussion and questions by students. As a means of informing a large number of inspectors and health officers of the methods of inspection, we believe that these schools were extremely valuable and that they stimulated greater activity in milk work in the county health units.

New Health Center in Milwaukee—On October 14, the new Matthew Keenan Health Center, made possible by a gift of $175,000 from the trustees of the Keenan Endowment Fund, was dedicated. A modern L-shaped building two and one-half stories high has been constructed to serve as a health department headquarters and clinic center for the northwestern section of Milwaukee. This institution is dedicated not to the treatment of disease but to the conservation of health and the prevention of disease.

The services which the Health Center will provide will include consultation and diagnostic service in chest conditions; X-ray facilities; public health nursing service; diphtheria, smallpox, and typhoid fever immunization; dental service for indigent children; eye, ear, nose, and throat consultation for indigent children; sanitary inspection; educational activities; and the promotion of child welfare. In addition to modern examining and diagnostic facilities, a small laboratory, dental clinics, an X-ray department, a large assembly room to serve the 27 public health nurses who work in this area is found on the second floor.

Popular health education has not

been overlooked as there is an auditorium with a seating capacity of more than 200 located in the basement. This auditorium contains a 20-foot wide stage with flood lights, curtain, and dressing room with a projection booth for motion pictures. This new health center is completely described and well illustrated in the October, 1932, *Bulletin of the Milwoukee Health Department.*

Childhood Tuberculosis—In June, 1921, the Lymanhurst School for Tuberculous Children was opened in Minneapolis. A 10-year progress report has been prepared. It is recommended that the present institution be enlarged in order to care for all children of school age who have demonstrable tuberculosis. The Mantoux intracutaneous test has been accepted as a standard because of its accuracy through its measured dosage of tuberculin and because it is desirable that such a test become the standard throughout the country. This test is used to screen out children suspected of having tuberculosis, the positive reactors being given the X-ray examination and more detailed physical examination. The need of careful history taking in every case is emphasized. The sharp line which was previously set up to separate tuberculous infection from tuberculous disease has been disregarded. Every child with a positive tuberculin reaction is looked upon as one with the first infection or the childhood type of tuberculosis. The report presents quite in detail many of the high points of the research work carried on at the Lymanhurst School.—J. A. Myers, *Childhood Type Tuberculosis,* Lymanhurst School for Tuberculous Children, Minneapolis, 1932.

HEALTH DEPARTMENT REPORTS

Madera County, Calif.—The first comprehensive report rendered by the health unit in this county of 17,164 covers the period April 1, 1931, to May 31, 1932. This is a very readable document, containing sound philosophy as well as local factual material. In addition to the services of the county health officer, county nurse, and school nurse, the county received coöperation from the state department of health in the conduct of baby clinics, 2 or 3 days a month, the estimated cost per day being $10. Several calculations are made to show the financial value of the unit to the county. For example, a smallpox vaccination campaign conducted during the year would have cost the county, had the work not been done by a health officer, close to the total amount spent for the health unit in a year. Following a case of psittacosis contracted from a love bird with the disease, a regulation was prepared by the county to govern the sale of love birds and parrots.

East Orange, N. J.—The 1931 health report is well up to previous high standards obtained by the earlier records. In connection with preschool work, the department has gone a step in advance of the delivery of birth records to mothers by nurses. With postcard acknowledgments to physicians, the doctors are asked whether at the end of 6 months they will vaccinate and immunize the new child, or prefer that these procedures be carried out by the health department. Of the doctors returning these cards, 20 per cent referred the procedures to the department. A letter urging the necessity of these protective measures is addressed to each parent when the child is 6 months of age, and with the letter is a postcard to be returned to the department with the necessary data for record when the procedures are completed. When the child reaches 1 year of age, a birthday letter is sent to him personally. This greeting urges not only protection against smallpox and diphtheria, but promises a Blue Ribbon

Certificate of Merit with the department's seal to all children who have not only had these protections but have had a complete medical and dental examination with correction of such defects as are discovered during the year before entrance to school.

Montclair, N. J.—Included in the comprehensive report of health activities for 1931 is a record of the first year of the generalized program in the amalgamation of the nursing service of the community under a bureau. A marked increase in the volume of nursing service rendered seems to be the experience since generalization was introduced. A saving in the budgets of various nursing agencies is noted in spite of reduced collections. Office management, supervision, and record work were simplified.

Hygienic Institute, Ill.—This 17th annual report, for the year 1931, contains an attractive photograph of the health center, a detailed organization chart, and a reproduction of the U. S. Chamber of Commerce award to LaSalle for accomplishments in health conservation. Immunization work has been extended in the health unit area, and communicable disease incidence was low. There has been but 1 death in 8 years from diphtheria in the population of 26,180.

Attention is directed to school physical examination records for the latter part of 1931 which indicate increased underweight, increased carious teeth, and lower percentage of correction of defects.

Kanawha County, W. Va.—In the space of a few well printed pages, bound in attractive covers, the county health officer has prepared a report of the health unit which is clear, interesting, and convincing. In the education field, school teachers provide health certificates, most of the examinations being made by the health officer. Some two-fifths of the population have been immunized against typhoid, while 50 per cent of the children under the teen age have been given protective doses against diphtheria.

Prior to the institution of the health unit, it was not unusual to have 300 to 500 cases of smallpox in the county every winter. Not over 10 per cent even of the teachers were protected. The 30,000 school children are reported protected, as well as the teachers. The people of the country "are free from this disease and there is no danger of its return while they practice prevention."

Los Angeles County—The California Taxpayers' Association in July, 1932, published a report of a survey of public health services in Los Angeles County which is of more than passing interest to administrators. There are 4 major health departments in the county, those of Los Angeles County, Los Angeles City, Pasadena, and Long Beach, beside a few small local departments. The county health department handles all health problems in the rural areas and in 35 of the 45 incorporated cities. The 3 city health departments handle the health problems within their respective areas and also inspect dairy farms in several other counties.

The survey report shows existence of duplication *between* and *within* departments. "Overlapping of responsibility and duplication of services now performed by the larger public health agencies in Los Angeles County can be eliminated by combining them into one department. A merger of the health services of Los Angeles City, Pasadena, and Long Beach under contract with the county would result in estimated savings of at least $200,000 annually." The report shows that taxpayers within these larger cities having their own

health departments are also aiding in the support of the County Health Department—an investment from which they receive no return.

Winnipeg, Canada—In 1931, a resident death rate of 7 per 1,000 people, and an infant mortality rate of 49 (per 1,000 live births) are recorded. These are commendable records for this city of 212,815. The net costs per capita of services for which this health department is made responsible are interesting: control and prevention of disease (strictly health service) $.59; scavenging and refuse disposal $1.09; street cleaning and flushing $.47; public comfort stations $.14; public baths $.22.

With reference to infant hygiene work, the report indicates that the visiting nurses are regarded as the first line of defense against disease, there being 39,797 calls made to babies' homes by 13 nurses, in addition to 180 visits to boarding homes. The 6 child welfare stations form the second line of defense, proving useful for keeping in contact with infants not requiring regular home visiting, and for preschool children who have been dropped from the nurses' visiting lists. There was an attendance of 9,125 for 289 afternoon sessions. The Babies' Clinic for feeding cases at the Milk Depot forms the third line of defense. To the clinic are referred cases which require modified feedings when parents cannot afford a private physician.

Territory of Hawaii—A very careful and thoughtful analysis of the tuberculosis problem in the Territory of Hawaii has been made by the Tuberculosis Committee of Palama Settlement, organized in 1931. The 84-page report is well illustrated with charts, graphs and statistical tables. The task of bringing together and digesting a large amount of data was a joint community enterprise, and the foreword gives particular credit to a committee of the American Association of University Women.

The Territory of Hawaii consists of 8 inhabited islands divided into 5 counties with a total population of 375,000. The governmental expense is about 12 million dollars annually, with 1 million roughly for the Board of Health. Nineteen per cent of the health budget was for tuberculosis hospitals. The total estimated expenditure for all phases of tuberculosis work in 1931 was approximately $1.80 per capita. Tuberculosis, the third cause of death, causes approximately 400 deaths annually in the Territory. For the past 4 years, 2.72 cases per annual death have been reported.

The Board of Health was established in the islands in 1850; tuberculosis was given attention in the program in 1900; and a separate tuberculosis bureau was created in 1910. There is in Honolulu a complete chest clinic under the Board of Health. Leahi Home (sanatorium) holds semi-monthly clinics for follow-up of discharged patients. A semi-monthly diagnostic clinic was also held during 1931 at the Japanese hospital. In addition, 35 chest clinics are held in various localities in rural districts of the Islands. There are preventoria on all the large islands, actively utilized. There are only 56 public health nurses in the Territory, most of them on a generalized basis, all effectively organized. The new Tuberculosis Committee has launched upon an active education program, and has already obtained commendable results from its first Seal Sale Campaign.

LABORATORY

THE APPLICATION OF A YEAST EXTRACT MEDIUM TO A TEST FOR DETERMINING QUALITY OF MILK *

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IN an effort to find a method which would give a reading more nearly representing the actual ability of the bacteria and enzymes present to produce the changes in milk of interest to the producer and consumer, the bromthymol blue milk test or colorimetric hydrogen ion method for determining the keeping quality of milk was devised by Cooledge [1, 2] in 1920. Several optional changes were suggested by Devereux [4] in 1928. The correlation coefficient between the test and the keeping quality was found by Cooledge to be $+0.75$. In a comparison of the bromthymol blue test and the methylene blue reduction test Devereux [5] found the coefficient for each test to be $+0.77$, which confirmed the work of Ellenberger et al.[3] on the methylene blue test, their coefficient being $+0.72 \pm 0.02$.

From the above data it may be concluded that the two tests are comparable as judged from the standpoint of accuracy. The methylene blue test is more easily applied, requires less equipment, and readings are made after relatively short incubation periods (20 min., 2½ and 5½ hours). However, short incubation periods might at times be a disadvantage in that they require the attention of the operator for several hours after starting the test, a point which has been called to our attention. The bromthymol blue test does not require the attention of the operator, in the great majority of cases, for 6 hours after the tubes have been inoculated.

EXPERIMENTAL

In an effort either to shorten the incubation period or improve the efficiency of the test, or both, a yeast extract medium [6] was substituted for the Cooledge broth. This new medium differed from the Cooledge broth in that dextrose was added, and yeast extract and peptonized milk were substituted for beef extract and peptone. The complete formula is given here.

YEAST EXTRACT MEDIUM

Yeast extract (Difco)	5 gm.
Peptonized milk (Difco)	10 gm.
Sodium chloride	5 gm.
Dextrose	10 gm.
Dibromthymolsulphonephthalein (Bromthymol blue)	0.020 gm.
Distilled water	1,000 c.c.

Adjusted to pH = 7. Autoclaved at 15 lb. for 15 minutes.

In the experimental work with the yeast medium the test was compared to the actual keeping quality of the milk, using time as the standard.

One hundred 200 c.c. samples of milk were taken in 250 c.c. sterile Erlenmeyer flasks from the receiving vats of two dairies. The test is made by adding 0.1 c.c. of the milk in question to 10 c.c. of bromthymol blue broth

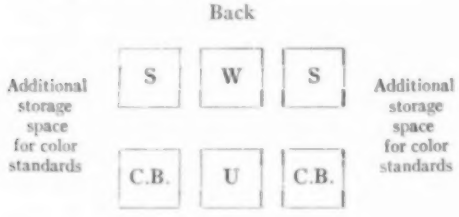
* *Journal Article No. 120* (n.s.), from the Michigan Agricultural Experiment Station.

and noting the rate of pH change when incubated at 37° C. until a pH of 5.8 is reached or until the tube has been incubated for 8 hours.

Bromthymol blue color standards * having a pH range of 5.8 to 7.4 (5.8, 6.0, 6.2...., 7.4) are used for making the readings.

Broth without the indicator is also prepared and used in the compensating blanks. The compensating blanks are inoculated and incubated in the same manner as the broth tubes containing the indicator. It is necessary to prepare only two compensating blanks for one day's run on any one batch of samples.

When it is desired to make a reading, the tubes and the compensating blanks are removed from the incubator, cooled to 20° C., and placed in the comparator. The top view of the arrangement of the tubes in the comparator when a reading is to be made is given below.



S = color standard
W = water blank
C.B. = compensating blank
U = unknown containing the milk in question

The unknown is compared to the color standards and the pH noted.

Cooledge devised a table in order that the milk could be scored, its keeping quality determined, and the purpose for which it is best suited determined. From experience with this table the author is of the opinion that milk scoring 70 or better is suitable for milk plant supply.

The keeping quality was measured by the time required for the milk to become unfit for table use as determined by taste. The samples were held at 18° to 20° C.

TABLE

THE COMPARISON OF THE BROMTHYMOL BLUE TEST AND THE KEEPING QUALITY OF MILK

Time of Souring	*Number of Samples*	*Bromthymol Blue Test Yeast Extract Medium* *Score range* *	
Hours			
24	13	35–55	53.5
26	7	35–55	49.3
28	9	35–55	52.7
30	12	60–75	66.6
32	12	60–75	66.0
34	6	80–100	79.1
36	13	80–100	77.3
38	9	80–100	80.0
40	2	80–100	77.5
42	1	80–100	85.0
44	3	80–100	90.0
46	13	80–100	98.0
	100		

* Score range

Reading	*pH*	*Score*	*Milk Suited for*
hours			
1, 2, 3	5.8	20–30	Condemning
4, 5, 6, 7, 8	5.8	35–55	For butter making
8	5.9–6.2	60–75	Condensing
8	6.3–6.7	80–100	Market milk or cheese making

In the table the results are arranged according to the time required for the samples to become unfit for use. Since souring was, in the great majority of the cases, the first undesirable quality displayed, the column is headed "Time of souring." The individual cases, that is, the score of each sample (data too voluminous to present), not the average scores, was used to calculate the correlation coefficient between the test and the keeping quality. The coefficient was found to be $+0.86 \pm 0.02$, which indicates a decided increase in the efficiency of the test when the new medium was employed.

Duplicate tests were made on 50 of

* The test has been so devised that the color standards and comparators of either the Hynson, Westcott, Dunning & Co. (use test tubes with a diameter of 1.8 cm.) or the LaMotte Chemical Products Co., can be employed (use tubes with a diameter of 1.5 cm.).

the samples using broth made according to the old formula and it was noted that acid development was more rapid in the yeast medium. This was particularly true with milk having a score of 50 or below according to the yeast medium. There were not enough samples of poor quality milk examined to warrant any conclusions on this point. While it was apparent that poor milk could be detected 1 to 2 hours sooner when the new medium was employed, insufficient data prevented the determination of the accuracy of the medium on milk of poor quality.

SUMMARY AND CONCLUSIONS

By changing the formula of the medium used in the bromthymol blue milk test the correlation coefficient between the test and the actual keeping quality of the milk was increased from $+0.75$ or $+0.77$ to $+0.86 \pm 0.02$; which is also an increase in accuracy over the methylene blue reduction test.

There were indications that the use of the new medium would permit earlier detection of milk of poor quality. The employment of this test, regardless of medium used, does not require the attention of the operator, in the great majority of the cases, for 6 hours after the tubes have been inoculated. The test, due to its high degree of accuracy and applicability, should be applied to the determination of quality of other dairy products.

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A YEAST EXTRACT MEDIUM FOR THE EXAMINATION OF MILK *

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DURING some recent researches on the isolation of lactobacilli and streptococci from the oral cavity a yeast extract medium was devised. Later, the ability of this medium to support the growth of milk organisms was determined; in addition to the common milk organisms this experiment included: *Lactobacillus acidophilus, L. bulgaricus, Brucella abortus, Streptococcus mastitis.* In brief the results were that the yeast extract medium in either the broth or the agar form produced luxuriant growth of the common milk organisms. *L. acidophilus* and *L. bulgaricus* grew excellently in the broth and colonies of sufficient size were obtained in the agar medium that they would not be missed in routine plate counting.

B. abortus could not be isolated directly from infective milk by this medium; however, it did support the growth of laboratory cultures of this organism. *S. mastitis* also failed to appear on plates made from infective

* *Journal Article No. 97* (n.s.), from the Michigan Agricultural Experiment Station.

milk, but excellent growth was obtained in the yeast extract broth and agar media when laboratory cultures were used.

Needless to say, the above mentioned organisms grow very slightly if at all in plain nutrient broth or agar.

YEAST EXTRACT BROTH

Yeast extract (Difco)	5 gm.
Peptonized milk (Difco)	10 gm.
Salt	5 gm.
Dextrose	10 gm.
Water	1,000 c.c.

Adjust pH to 7.0; autoclave for 15 minutes at 15 lb. pressure.

To prepare the agar 15 gm. of washed agar are added to each liter of the broth, which necessitates dissolving in a steamer or autoclave.

At the present time several applications are being made of this medium; one using the broth, containing an indicator, for determining keeping quality of milk and one using the agar for determining the bacterial content of milk.

VITAL STATISTICS

Provisional Summary of Mortality from Automobile Accidents, 1931—The Department of Commerce has announced that during the calendar year 1931 in the death registration area of continental United States, exclusive of the State of Utah, there were 29,547 deaths from automobile accidents, not including collisions of automobiles with railroad trains and with street cars. In 1930, in the same area, there were 28,950 deaths from this cause. The death rates were 24.9 and 24.5 for the respective years. The estimated population of the United States death registration area, exclusive of Utah, was 118,051,800 in 1930 and 118,740,600 in 1931. In these two years 47 states, the District of Columbia, and the 8 registration cities in the nonregistration State of Texas composed the area in continental United States, or 95.7 per cent of the total population.

Considering the states by geographic divisions, the Pacific group had the highest death rate in 1931 as well as in 1930. The rate was 34.6 per 100,000 population in each year. Next in order of groups in 1931 are the Mountain (28.9), the East North Central (28.0), and the Middle Atlantic (25.3)—each higher than the rate for the registration area in either year. Contrasting these high rates with the low rates of the West South Central group (17.5), the East South Central (18.2), and the New England groups (20.8), it would appear that in the more thickly populated centers fewer automobile accidents take place.

Considering the states separately, those with the highest death rates from automobile accidents in 1931 were Nevada (68.5), Wyoming, (43.0), California (36.8), Florida (34.4), and Arizona (34.3), while in 1930 the order was Arizona, California, Florida, Nevada, and Wyoming. The rate for Nevada almost doubled, or 68.5 in 1931, as compared with 37.4 in 1930. The lowest mortality rates from this cause in 1931 were for Mississippi (14.0), North Dakota (16.1), Arkansas (16.5), Oklahoma and South Dakota (each 16.6), and Rhode Island (16.7). States with the lowest rates in 1930 were, in order of rate, North Dakota (11.6), South Dakota (16.1), Arkansas and Mississippi (each 16.5), Alabama (17.3), and Louisiana (17.6).

In the group of 92 cities of 100,000 or more population there were 9,594

deaths, or a rate of 25.9 per 100,000 population from automobile accidents in 1931, as compared with 9,555 deaths or a rate of 26.3 in 1930. The cities which had the highest mortality rates from automobile accidents in 1931 were Camden (84.0), Miami (52.4), Richmond (48.8), Chattanooga (47.5), Nashville (45.7), Jacksonville and Gary (each 42.5), San Diego and Indianapolis (each 42.2), Trenton (42.0), Tampa (41.0), Columbus (40.9), Toledo (40.4), and Bridgeport (40.1). Considering only accidents within the city limits, for certain cities, Trenton's rate was only 9.7, Camden's 31.1, Richmond's 22.2, Chattanooga's 23.7, and Tampa's 21.0.

The total number of deaths within a city should not be taken as the measure of the automobile hazard. The location of the city with reference to automobile traffic, the volume of traffic, hospital facilities, and other factors, should be considered. Camden, N. J., serves as an excellent illustration of this statement. There occurred 100 deaths due to automobiles in that city in 1931, but only 37 were due to accidents within the city limits. The remainder (63) were due to accidents outside. Other cities—Fort Wayne, Nashville, Richmond, Tampa, and Trenton—show large reductions when measured by this standard.—*Provisional Summary of Mortality from Automobile Accidents.* Dept. of Commerce. Bureau of the Census. Division of Vital Statistics. 1931.

Infant Mortality Among Negroes in New York City—During the past 20 years the infant mortality rate in the city of New York has dropped almost 50 per cent, the rate averaging 107 per 1,000 live births in the 5 years 1910–1914, and 59 during the past 5 years. Among the negro population in this city the corresponding figures were 209 and 104. In other words, the measures taken to reduce infant mortality were fully as effective among the negroes as they were in the rest of the population. While this is very encouraging, the fact that the infant death rate among negroes is almost double that among the population of the city as a whole, indicates the need of concentrating control measures on the sections of the city having large negro populations. Analysis of infant deaths according to cause, shows that tuberculous disease causes an undue proportion of deaths of negro infants. Whereas the infant death rate from all causes in negroes is approximately double the rate for the city as a whole, in tuberculous disease it is about 4 times the city rate. In infant deaths charged to malformations, the rate is actually lower among negroes than it is in the entire population. It is difficult to say whether the figures for this cause of death are significant for the number of deaths charged to negroes against malformations is small. Moreover, the death rate for "diseases of early infancy" (*International List* 1929 revision, Nos. 158–161) is distinctly higher among negroes.

Closely associated with infant deaths, are puerperal deaths. Among the general population of New York City, the death rate from puerperal causes has remained around 5 per 1,000 live births (6 in 1931); among negroes during the same period, it has been about twice as high, ranging between a low rate of 8 per 1,000 live births in 1923 and 15 in 1920. The puerperal death rate among negroes in New York City in 1931 was 13.—New York City Dept. of Health. *Weekly Bull.*, 21: 233–234 (July 30), 1932.

Pernicious Anemia in Toronto, Canada, 1923-1926 and 1928-1931—A review of the mortality statistics for Toronto, Canada, discloses a remarkable change in the death rate from

pernicious anemia since Minot's and Murphy's important discovery in 1926, of the benefits of liver therapy for patients afflicted with the disease. Allowing for certain influencing factors, such as the tendency toward better diagnosis, and differences in methods of classifying the causes of death, the death records for pernicious anemia in Toronto and elsewhere are none the less indicative of the great value of this new therapeutic agent.

In Toronto in 1927, the year immediately following the introduction of liver therapy, the death rate from pernicious anemia was reduced by nearly one-half, and the new lower rate has more or less continued throughout the past 4 years.

For purposes of comparison between the two periods of time, before and after the use of this new treatment, and in order to illustrate more effectively the substantial reduction that has taken place in the pernicious anemia death rate, the years 1923–1926 inclusive, and 1928–1931 are combined to make two 4-year periods. The year 1927 is excluded because its inclusion would result in differences of rates which would be of a negligible quantity. There was a total of 300 deaths attributed to pernicious anemia in Toronto during the period 1923–1926, this number of deaths representing a rate of 13.7 deaths per 100,000 population, while in the period 1928–1931 the number of deaths from this cause was reduced to 184, or a rate of 7.5. This marks a reduction in the death rate of over 45 per cent following the introduction of this new therapeusis.

Analysis of the pernicious anemia deaths according to sex and age groups, reveals interesting changes similar to those that have taken place in the statistics for diabetes mellitus after medical research had produced the insulin treatment. A prolongation of life is significant in the mortality records for both of these diseases.

In the case of pernicious anemia, comparison between the two selected periods shows that following liver therapy, 6.3 per cent more males and 12.9 per cent more females at time of death had attained the mark of 55 years of life or more. Excluding the more extreme ages at either pole of the life span (in which the occurrence of pernicious anemia is more or less uncommon), it is found that between the ages of 25 and 84, the average age at death has increased thus far, 3.6 years for males, and 4.5 years for females.

Specific death rates by sex and age groups between 35 and 79 years show, throughout, higher rates for females; they also indicate substantial reductions when comparison is made of the rates between the two 4-year periods, 1923–1926 and 1928–1931. Between the ages of 35 and 49 years inclusive, a greater reduction is shown for females than for males. The percentage reduction in the female rate is 75 as compared with 64.5 for the male specific rate. Above the age of 49 years, there is a greater reduction in the male rates. For males 50 to 64 years of age, the percentage reduction is 58.9 as against 51.5 for females; for the age group 65–79 years (the age which produces the highest rate of mortality from pernicious anemia), the reduction in death rate for males is 36 per cent or more than double the percentage decrease for females.—*Monthly Report of the Department of Public Health of the City of Toronto,* Ontario, Canada, July, 1932, p. 1–3.

Vital Statistics for New Zealand, 1931—Following a slight increase in 1930, the number of live births registered in New Zealand during 1931 continued on the downward trend, a total of 26,622. The birth rate, which has shown an uninterrupted decline since 1920, reached the lowest level on record with a rate of 18.42 per 1,000 of mean population. This compares

with a rate of 18.80 for 1930, a decline of 2 per cent. Fifty years ago, in 1882, the birth rate was 37.32 per 1,000 of mean population. Expressed in a more effective way, if the rate prevailing in 1882 had been recorded in 1931 on the present population, there would have been approximately 53,923 children born in the Dominion during the latter year, instead of only 26,622.

In spite of an abnormal year embracing a disastrous earthquake and an increase in virulence of influenza, the record of deaths for 1931 is much more satisfactory than that for 1930. Altogether 12,047 deaths were registered, as against 12,199 in the previous year. The corresponding death rates are 8.34 per 1,000 of mean population in 1931, and 8.56 in 1930.

The most remarkable feature of the vital statistics for 1931 is undoubtedly the phenomenal drop in the already very low infant mortality rate. In 1930 this rate stood at 34.48 per 1,000 live births, a figure slightly in excess of that recorded for the previous year. The interrupted downward movement, however, was again resumed in 1931, when the rate fell to the unprecedentedly low level of 32.15 per 1,000 live births. This represents a decrease of 68 in the actual number of infants succumbing during the first year of life. The decrease in the number of infant deaths registered in 1931, as compared with 1930, has taken place principally in the group of "diseases peculiar to early infancy."

The stillbirth rate in New Zealand shows a rising tendency, but this is not sufficient to reverse the trend of the declining infant mortality rate when stillbirths are taken into consideration with this latter figure. The unusually large decrease in both the number of infant deaths and of stillbirths for 1931 has had the effect of reducing the combined rate or "total infant mortality" to an unprecedentedly low level.

The health record of New Zealand for 1931 is even more satisfactory than that for the previous year. Improvements have been effected in unexpected directions, while very few outstanding increases in important causes have been recorded. With the exception of influenza, epidemic diseases were particularly quiescent during 1931. No deaths from measles were reported and a new low level for diphtheria (0.38) was reached. A most important feature is the reduction of 32 in the number of deaths from all forms of tuberculosis, bringing the death rate down to 35.5 in 1931, as compared with 45.5 in 1930. Principal diseases of the respiratory system, other than tuberculosis, also show a decrease of 196 deaths, or a 21 per cent reduction. Other important decreases were recorded for heart disease, which declined from a death rate of 203.3 in 1930 to 195.0 in 1931, meningitis from 4.9 to 2.8, and cerebral hemorrhage from 46.2 to 43.9, for the years 1930 and 1931 respectively.

On the other side of the picture, the cancer death rate increased from 101.9 in 1930 to 103.3 in 1931, influenza from 9.2 to 15.3, suicide from 13.5 to 15.6 and the death rate from accidental causes from 54.2 to 64.1. This marked increase in accidental deaths was due primarily to the earthquake on February 3, 1931.—*Report on the Vital Statistics*, New Zealand, 1931, pp. 5–12.

PUBLIC HEALTH ENGINEERING

1. *View of track drainage filter bed on reservoir side of railroad*

FILTRATION OF RAILROAD TRACK DRAINAGE ALONG A MUNICIPAL WATER SUPPLY RESERVOIR

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THE City of Gloucester, Mass., recently built an auxiliary water supply reservoir which will furnish about 1 million gallons per day during extremely dry periods.* The watershed of the reservoir lies adjacent to the built up portion of the city, but with the exception of 7 houses remotely situated from the reservoir, it is free from habitation and consists largely of undeveloped land. It is traversed, however, by a state highway and a railroad. The highway did not present any particular problem from a sanitary viewpoint as all land adjacent to the highway could be acquired by the city, and, moreover, the highway was not in close proximity to the reservoir. The railroad, however, did present a problem which was given careful consideration since it caused much concern to the Massachusetts Department of Public Health, which has jurisdiction over all water supplies in the Commonwealth.

There are between 30 and 35 passenger trains operated over the railroad each day. The reservoir, which is nearly a mile long, lies adjacent to the railroad the greater part of its length, the normal water level being about 7

* See "Babson Reservoir—Built in Six Months" in *Am. City*, Sept., 1932.

2. View of track drainage, filter bed on far side of railroad from reservoir. Effluent from filter bed passes under railroad through old railroad culvert

feet below the lowest part of the track. The gate house at the dam, where the water enters the distribution system, is only about 1,000 feet from the nearest point where the reservoir adjoins the railroad. The reservoir is small, having a capacity of 200 million gallons, of which 178 million gallons are usable. This is equivalent to about 178 days' supply on the basis of the safe yield of the reservoir. It is quite probable, however, that the stored water will be used at times in a much shorter period.

The engineers on this project were of the opinion that the possibility of the track drainage polluting the water supply was remote because toilets in the trains could be locked and their use prohibited while the trains passed through the watershed, the soil along the railroad was gravelly, and the track was ballasted with cinders. It was felt, also, that some natural purification would prevail in the reservoir; moreover, chlorination of the water would have provided sufficient protection against pollution if it were deemed necessary.

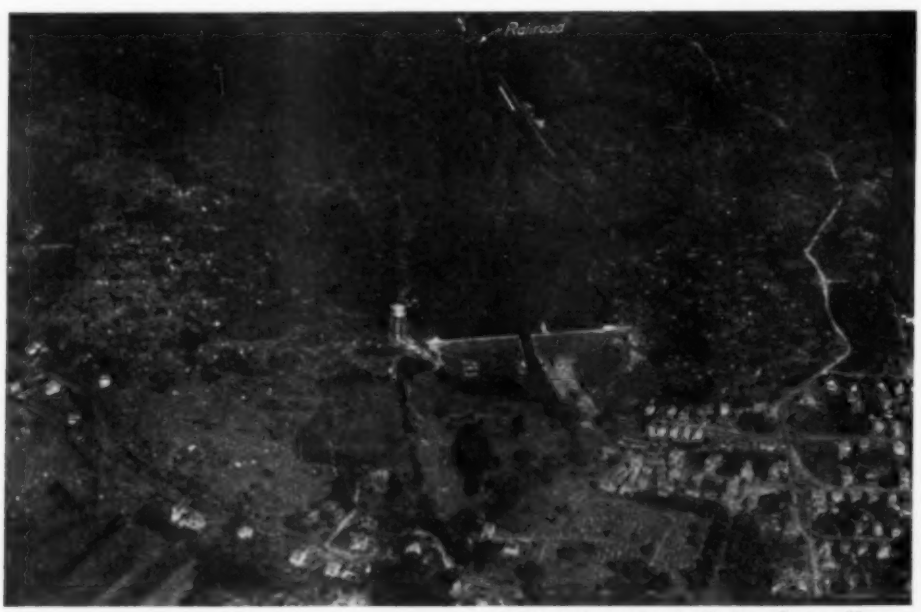
The Massachusetts Department of Public Health recommended that consideration be given to the removal of the track drainage from the watershed. Studies showed that the practicability of such a scheme was questionable as it would have been necessary to build a watertight drain underneath the reservoir, extending to a point of discharge below the dam; the cost of the work would have been prohibitive. Subsequently, studies were made in conjunction with the engineering division of the Department of Public Health which indicated that a feasible method of safeguarding the purity of the supply would be by filtration of the track drainage, the effluent to be discharged into the reservoir. This method was approved by the department and the necessary works were built. This precaution was in conformity with one of the long established policies of the department, which requires that any possible pollution of public water supplies must be dealt with at its source before the water reaches the reservoir. The scheme of filtering the track drainage for precautionary protection against pollution is entirely practicable and no doubt worth while, particularly in the case of a small reservoir.

The work involved the construction of paved gutters and ditches along both sides of the track, where necessary, to collect the drainage and carry it to sand filter beds which were built at convenient low points along the railroad right of way. The sites of the beds were cleared, grubbed, and roughly leveled. The filter beds consist of 3 to 4 feet depth of sand of the same characteristics as that used for fine aggregate in concrete. No underdrains were provided in the beds. The capacity of the beds was designed for a rate of run-off, as computed by the rational method, using a rainfall intensity curve of 10-year frequency. The areas of the beds were computed for a filtration rate of 10 million gallons per acre per day. This basis of design is conservative; smaller beds might possibly have served the purpose fully as well as those built.

Six filter beds, having a combined total area of about 6,800 square feet, about 4,000 linear feet of paved gutters, and about 450 linear feet of ditches were built to handle the drainage from about 4,000 linear feet of track. The construction cost, exclusive of engineering, was $5,900 for the filter beds and $6,300 for the paved gutters and ditches. The total construction cost per foot of track drained was $3.05.

All construction work was done by the railroad through agreement with the City of Gloucester, which agreement further provides that all maintenance and repair work be done by the railroad at the city's expense. The railroad insisted upon these requirements so that it would not be necessary for any city employees to work on their right-of-way. An enabling act was passed by the Massachusetts Legislature authorizing the city officials to enter into this agreement with the railroad.

The railroad has coöperated fully with the city in the protection of the water supply. A standing order is in force requiring toilet doors in all cars to be kept closed and locked between stations where the reservoir is located.



Courtesy of Aero-Scenic Airviews, Boston, Mass.

3. Babson Reservoir, Gloucester, Mass.
Aerial view showing relation of railroad to reservoir

INDUSTRIAL HYGIENE

Doing Away With the Open Window in the Hospital—Air conditioning and sound control will be the most important subjects in hospital construction of the near future. The necessity of controlling outside noises necessitates changing the present form of window construction. Windows must be kept closed.

By the use of double or triple glass, with an air-space between, noise and draft, odors, dust, pollen, insects, etc., can be kept out, light at the same time being admitted. Such will also reduce by 50 per cent the expense of cleaning rooms, curtains, and draperies and the wear and tear on furniture and fabrics. The death rate alone from window accidents is enough to condemn windows and eliminate them from new construction.

Proper window construction will also keep out cold in winter and heat in summer. "By using a single glass, on a zero day with an inside temperature of 70° F., the glass surface temperature will be 17.3° F. With double glass the surface temperature will be 49° F., and with triple glass the surface temperature will be 59.9° F.

By means of a type of unit or cabinet ventilator for each room, air can be taken from the outside, filtered, humidified when necessary, and heated to the proper temperature in winter and cool in summer. The device can be made automatic, thus maintaining the desired temperature without requiring any continual regulating by hand. Even the steam radiator is removed. Such cabinets can be plugged in like a radio and will do away with large expensive power plants.

At the same time roofs and ceilings will be insulated and reduce the first cost of heating plant by 60 per cent.

"By actual tests, for two winters, in several insulated buildings in Ontario, the temperature has not gone down below 30° F., although the outside temperature had dropped to 17° below zero. Yet no heating plants are installed in these buildings. The only heat available to keep them above the mean temperature outdoors during periods of extreme cold weather, is supplied by the sun and earth." (James Govan, architect, Toronto, *Transactions of A.H.A.*, 1931, p. 346.)

Even electric fans will be eliminated and cool, fresh, clean air will be gently diffused in every part of the room.

This temperature control will have a marked effect not only on patients but on the health and efficiency of employees as well. It would be a boon to asthma and hay fever patients.—Asa S. Bacon, Superintendent, Presbyterian Hospital, Chicago, *Modern Hosp.*, 39, 2:37–38 (Aug.), 1932. E. R. H.

The Influence of the Humidity of the Air on Capacity for Work at High Temperatures—Author's summary:

The physiological action of two subjects was investigated in air at a temperature of 70–100° F. and of 40–92 per cent of relative humidity. The experiments lasted 3 hours, and one of the subjects performed mechanical work (step climbing) at the rate of 14,000 kg. m. per hour.

The pulse rate was about 10 beats greater in dry air than in moist air of the same wet-bulb temperature. The winter observations agreed well with the effective temperature scale, but did not agree with the wet bulb, the dry bulb or the kata-thermometer scales.

Acclimatization effects showed themselves in experiments made at a dry-bulb temperature of 87° F. or more, but only very slightly in those made at 81° or less. Acclimatization was fairly well marked in the summer, the pulse rate being 5 to 10 beats less than in the winter, and no longer agreeing with the effective temperature scale.

The body temperature corresponded with the pulse rate, for it was 0.3–0.6° F. higher in dry air than in moist air of the same wet-bulb temperature, and was 0.15° lower in summer than in winter. The winter observations agreed well with the effective temperature scale.

The skin temperature of the face was found to depend on the dry-bulb temperature of the air, but that of the trunk showed no agreement with any of the scales. In moist air it was 1° F. lower than that of the face, and in dry air, 6° lower, owing to the cooling effect of increased sweating.

The gross mechanical efficiency fell off slightly at temperatures above 70 or 75° F. It was affected by the dry-bulb temperature of the air as well as the wet bulb, but not to the extent indicated by the effective temperature scale.

The weight of moisture lost by sweating corresponded well with the effective temperature scale. It increased gradually in consecutive experiments made in dry air, and diminished in those made in moist air.

The degree of fatigue experienced in dry air was considerably greater than in moist air of the same wet-bulb temperature, and it corresponded with the effective temperature scale.—

H. M. Vernon and C. G. Warner, *J. Hyg.*, 32, 3:431–463 (July), 1932.

E. R. H.

Projected Study on Workmen's Compensation—The Bureau of Medical Economics outlines some of the more important phases and tentative conclusions of its study of workmen's compensation.

The American compensation system (for industrial accidents and occupational diseases) came early to emphasize legal and financial features to the almost total neglect of the medical side. Physicians in the United States showed little interest in a movement that, within a generation, was to be a dominating influence in the practice of a considerable percentage of them.

At first the function of the physician was primarily that of an expert witness and in some instances no provision was made for medical care, while in the majority it was limited to from 2 weeks to 30 days and the cost from $25 to $50. It was some time before it was realized that much depended upon the adequacy of medical care and there was a consequent rush to increase the amount of such care until today nearly half of the jurisdictions place practically no limit on the time and money granted for this purpose.

Today it has become evident that every phase of the administration of compensation rests for its success upon the skill of physicians and surgeons. Even the prevention of accidents is dependent upon mental and physical examinations, placement, treatment, etc.

Despite this, there is only one state in which the law provides for a physician in any official administrative capacity concerned with determining the policy of compensation and administration. Today between 70 and 80 million dollars are paid annually for the medical and hospital phases of compensation cases—a sum nearly twice as great as that paid to the physicians of Great Britain under a National Health Insurance System. In our system also there has been a tendency to introduce the most undesirable elements of commercialism into medical relations.

In some states, chains of clinics have arisen with salesmen who solicit business—for inferior service. The plant medical systems have been unduly stimulated by the profit motive of saving compensation rather than care for the patient. Recently these schemes have grown to include complete medical care, first of employees, then of their families, and finally of entire communities. "Pay-roll check-offs" have been legalized.

In all of this physicians have had little to say. It has been the work of laymen. Indeed, in some sections, physicians engaged in compensation and industrial work have lost touch and sympathy with the great body of practitioners and to some extent with the

traditions and ideals of the medical profession.

A critical point in the evolution of compensation seems approaching. Will a lay-controlled system of health insurance evolve for the industrial population, or a system of ethical care for workers directed adequately by the profession?

Among other industrial organizations the National Industrial Conference Board has recognized these issues. There is an immediate and urgent need for medical representatives in the administration of compensation.—*A. M. A. Bull.*, 27, 6:131–133 (June), 1932.

E. R. H.

Report of the Royal Commission on the Use of Radium and X-Rays in the Treatment of the Sick, etc.—There seems to be a definite relationship between the incidence of cancer and certain occupations: (1) Work in tar, pitch, and bitumen briquettes; (2) Work in mineral oil or paraffin or in any compound, product or residue of either of these products; (3) Work in arsenic; (4) Work in X-rays and radium; (5) Work in mines, e.g., the lung affection of Saxon miners called "Bergkrankheit"; (6) Chimney sweeps' work; (7) Work in anilin dyeworks.

The specific irritants of carcinogenic agents appear to require a long time to show their effects. In some instances the action of the irritant may have disappeared long before cancer declares itself. The oil bearing shales of Scotland and the lignite of Germany are prone to develop skin affections. Mulespinners' disease (epithelioma of the scrotum) is attributed to soaking of the parts by lubricating oils thrown off from the spinners. Approximately 2.5 per 1,000 of mulespinners develop this disease.

Arsenic cancer occurs in the manufacture of "sheepdip" and among tin smelters. X-ray cancer is, of course, well known. "Bergkrankheit" of Erzebirge, Saxony, which causes malignant tumors of the lungs, has been known since 1897. The dust of the mines contains bismuth, cobalt, and arsenic while the air is radio-active. The affliction lasts for years, but proves fatal as a rule in middle life.

Chimney sweeps' cancer is probably as common today as ever it was—5 or 6 deaths from it a year in England. Bituminous coal dust from the Midlands is said to be the most tumor-producing.

The fact that Hoffman found no evidence of malignant tumors as a contributory cause of death in an analysis of nearly 2,000 death certificates of lead workers in the United States is significant in the lead treatment of cancer.

Statistics show in the last few years that cancer has steadily increased its toll among industrial classes both in Canada and the United States. The increase for the year 1931 as compared to 1930 was 8 per cent for cancer of the digestive tract and peritoneum, and 6.3 per cent in cancer of the breast.—John M. Robb, Minister of Health of Ontario, *et al.*, Legislative Assembly of Ontario, *Sessional Paper No. 41*, 1932: 171 pp. (see pp. 137–138). E. R. H.

Physiological Response to Breathing Hot Air—When subjects sitting at rest in a cool environment breathe hot moist air, the limit of tolerance lies between 140° and 150° F. (wet bulb). When doing work, the tolerance limit falls between 130° and 140° F. (wet bulb).

The local effects noticed are a transient sensation of burning in mouth and throat and reddening of palate and throat. With those at rest, there is an increase with some irregularity in the respiration rate. With those doing work, sweating is noticeably greater when the wet bulb temperature of the inspired air is above body temperature.

The limits of tolerance for subjects at rest and breathing hot dry air lie be-

tween 270 and 367° F. (dry bulb); corresponding limits for those doing work lie between 200 and 220° F. (dry bulb).

The local effects of breathing hot dry air are extreme dryness of mouth and throat with a slight sensation of burning in some subjects, frequent coughing, and slight reddening of palate and throat.

No general effects were observed as a result of breathing hot dry air.—Esther M. Killick, University of Leeds, *J. Hyg.*, 32, 3:332–339 (July), 1932.

E. R. H.

Industrial Electrical Accidents in Their Neurological Aspect—The author discusses historically and statistically the effects of the electric current upon the nervous system, including shocks, legal electrocution, and the fundamental matters of voltage, amperage, type of contact, resistance of tissues, duration of current, and the points of contacts.

The paucity of electrical injuries in Great Britain is largely due to efficient Home Office control. There are periodical inspection of apparatus, notification of accidents with subsequent inquiries, followed if necessary by prosecution.

The immediate treatment of electric shock consists in artificial respiration with the possibility of inhalation of CO_2 being of service. "Countershock" is discountenanced. Artificial respiration should be continued without interruptions for 4 hours, although there is no unequivocal evidence in medical literature (with one possible exception) where life has returned after being suspended for more than ½ hour. Therefore case reports of such prolonged suspensions should be brought forward whenever they occur.—MacDonald Critchley, *J. State Med.*, 40, 8:459–470 (Aug.), 1932.

E. R. H.

Silicosis in the Pottery Industry—The Home Office, Great Britain, has drafted regulations to combat as far as possible the silicosis risk inherent in the pottery industry.

The necessity for intervention is proved by the very considerable sum—£20,000—paid for compensation in 1930 in the china and earthenware industry, in respect of 98 new cases, 36 cases from the previous year, and 34 deaths. The regulations in question, known as the Draft Pottery (Silicosis) Regulations, extend the wide-reaching Code covering the manufacture and decoration of pottery, but include also premises in which flint is ground. They require the provision of effective exhaust ventilation for all dusty processes, a large number of which receive specific mention, with a concession consisting in permission to effect the work as an alternative by wet methods. The recognition of the use of a water or steam spray as an alternative to exhaust ventilation is, it is remarked, in contradiction to the view expressed at the Silicosis Conference at Johannesburg, where exhaust draught and the use of water was advocated. Cleaning by vacuum is permitted during working hours, and the Code is in general based on the dictates of common sense.

Indust. & Labour Inf., League of Nations, 42, 7:242 (May 16), 1932.

E. R. H.

FOOD AND NUTRITION

The Value of Salmon Oil in the Treatment of Infantile Rickets—The authors summarize their work as follows:

Thirteen children with active rickets have been treated with salmon oil, and the response to treatment, as shown by clinical examinations, roentgenograms and determinations of blood calcium and phosphorus, has been recorded at intervals of 1 or 2 weeks. Oil was used which had been prepared from the waste products of three species of salmon, the Pink or Humpback, the Chinook or King, and the Sockeye or Red.

The oil was given in doses of from 10 to 20 c.c. a day, the average being 13.8 c.c. It was well taken and well tolerated by all thirteen children.

Response to treatment as shown by roentgenographic and blood studies was very prompt, and advanced healing was brought about in from 3 to 9 weeks.

Of the 6 children whose blood was studied after from 6 to 8 days of treatment, 5 showed definite increase in the serum calcium or serum phosphorus or both; 2 reached the normal level by the end of the first week, 3 by the end of the second week. Three children who were reëxamined for the first time after 2 weeks' treatment showed a return in serum calcium and phosphorus to the normal level. Only 1 child showed a greater delay in response to treatment.

Roentgenographic evidence of response to treatment was equally prompt, 7 children showing the fresh lime salt deposits in 1 week, and 5 others in 2 weeks. One child did not show fresh deposits until the end of 3 weeks. Craniotabes improved rapidly under treatment with salmon oil. Biologic assays for vitamins A and D were made of the three samples of salmon oil used. They showed that the Sockeye and Chinook oils were nearly equal in vitamin A potency to a composite sample made from nineteen medicinal cod liver oils, and that Pink oil was distinctly inferior in vitamin A potency. The Sockeye and Pink oils contained twice as much vitamin D as the cod liver oil composite, and the Chinook oil about 50 per cent more than the same sample of cod liver oil.

There is a potential supply of 1,000,000 gallons of salmon oil available through the salmon canning industries of the Pacific states and Alaska. Approximately three-fourths of this would come from the species of salmon used in this study and shown to be potent in the treatment of rickets. About 370,000 gallons would come from the species of red salmon known to be high in vitamin A as well as vitamin D. The production at low cost of such a quantity of salmon oil would be of special value at this time, when the nutrition of many infants and children is suffering from lack of proper and adequate food.

Though exact comparison of the efficacy of salmon oil in the treatment of infantile rickets with that of other antirachitic agents cannot be made, it may in general be said that the salmon oil used in the present study was probably a more potent antirachitic agent than the average cod liver oil and compared very favorably in the rapidity of its action with viosterol. Like cod liver oil, salmon oil, especially that from the more highly colored species, has the advantage of providing vitamin A in addition to vitamin D. It also provides an apparently easily digested fat, and from the limited experience of this investigation would seem to be well taken and well tolerated.—

Martha M. Eliot, E. M. Nelson, Susan P. Souther and M. Katherine Cary, *J.A.M.A.* 99:1075 (Sept. 24), 1932.

A Study of the Milk, Blood, and Excreta of Cows Fed Moderate and Excessive Amounts of Irradiated Yeast or Ergosterol—The effective incorporation of vitamin D in milk, either through the feeding of irradiated yeast or irradiated ergosterol having been demonstrated, this work extends the study by feeding excessive therapeutic and toxic amounts of both of these substances, as well as undertaking to determine the effect of such doses on the cows.

Incidentally, it was found that the milk most satisfactory from the clinical standpoint was that from cows receiving 60,000 and 90,000 vitamin D units daily in the form of irradiated yeast.

This yeast is rich is vitamin B, each cow receiving about 3,500 units daily. It was found that the vitamin B in the milk was not increased by this procedure.

Moderate supplements either of irradiated ergosterol or irradiated yeast do not change the phosphorus or calcium concentration of the milk or cream. Cows which received about 450,000 units by means of irradiated yeast or about 1,500,000 units through irradiated ergosterol, showed a slight rise in the calcium and serum and a marked increase in inorganic phosphate.

In this connection the breed of the cows must be taken into consideration since this factor is of importance in relation to the output of milk. For example, the figures of calcium and phosphorus are comparatively low for the milk of Holstein cows, which can probably be attributed to the fact that cows of this breed secrete a large quantity of milk. The amount of vitamin D excreted was tested on cows receiving the normal supplements of irradiated yeast (about 300 gm.). No vitamin was recovered from the urine but the bowel eliminated about 25 per cent of the vitamin D ingested.

One of the cows receiving excessive supplements of irradiated yeast was slaughtered and the liver assayed. Assuming the beef liver to contain 3 to 5 per cent of fat, the fat from this liver contained from 20 to 30 units of vitamin D per gm., or an activity greater than cod liver oil. No instance of harmful effect of feeding excessive supplements was noted, based on lack of evidence of calcification or abnormal ash content of the ribs.

To determine the effect of the breed, similar amounts of vitamin D as irradiated yeast were given to three different types of cows, one producing a large quantity of milk with low butterfat, one with low production of milk with low butterfat, and the third with low production of milk and high butterfat. This experiment showed that the lower the production of butterfat the lower the concentration of vitamin D in the fat, and the greater daily production of milk the greater total number of units of vitamin D incorporated in the milk.

This experiment warrants the conclusion that vitamin D supplement should be given according to the percentage production basis rather than as to the individual production of cows.—A. F. Hess, R. F. Light, C. N. Frey, and J. Gross, *J. Biol. Chem.* 97:369 (Aug.), 1932.

The Chemical Nature of Vitamin C—Since its discovery, hexuronic acid has been recognized as strikingly similar to vitamin C. Tillmans and coworkers (*A.J.P.H.* 22:1002, Sept., 1932) showed the close relation between vitamin content and reducing power of plant substances and concluded that the reducing factor and the vitamin were identical. Zilva found certain fractions of lemon juice with a high antiscorbutic activity but low or no reducing power, as well as fractions potent in reducing power but without antiscorbutic activity, justifying his conclusion that the reducing substances and vitamin C were not identical.

The present work was undertaken to confirm a previous test by these authors pointing to the identity of the two factors. The hexuronic acid used in the test was prepared in crystalline form from suprarenal glands of the ox and was 2 years old at the time of the experiment. The amount of acid was weighed out every 8 days and dissolved in water and aliquot portions fed by means of a pipette. Previous experiments having shown that 1.5 c.c. of lemon juice is a protective dose and that this amount contains approximately 0.5 mg. of hexuronic acid, in this test 1 mg. of hexuronic acid was used to

allow for exposure to air and age of the preparation.

Compared to the animals receiving the hexuronic acid, were positive controls which received 1 c.c. of lemon juice daily and negative controls on the basal scorbutic diet. Cod liver oil (0.5 c.c.) was given to each test animal per week. No scurvy was found in the animals receiving hexuronic acid on an average 90-day test. The animals receiving 1 c.c. of lemon juice showed some scurvy and those on the basal diet were markedly scorbutic. All of the negative controls died within 20 to 34 days. The animals receiving hexuronic acid showed normal growth and weight curves compared to those of the controls on lemon juice.

Since it is assumed that animals protected from scurvy for 90 days will remain so indefinitely, these authors conclude that vitamin C is a single substance identical with hexuronic acid.—Joseph Louis Svirbely and Albert Szent-Györgyl, *Biochem. J.* 26: 865, 1932.

Vitamin C Content of Sheep-Liver: With Observations on the Effects of Freezing and Storage—Aqueous extracts of sheep-liver were prepared and administered to guinea pigs to determine the antiscorbutic activity. Two methods were employed —(1) curative action on guinea pigs of graded doses of the extract in comparison with that of cabbage; (2) determination of the smallest amount of extract added daily to the basal diet necessary to prevent histological scorbutic changes in the teeth of normal guinea pigs.

In the first experiment, the animals were fed on a scorbutic basal diet of Sussex ground oats, 3,600 gm., bran 400 gm., dried egg-yolk 200 gm., and 1 per cent of cod liver oil was added daily. At the onset of scurvy and cessation of growth, daily doses of 10 c.c. and 5 c.c. of liver extract were administered. For comparison, two other groups of animals were given 1 gm. and 0.5 gm. cabbage per day respectively, and in addition 5 c.c. autoclaved liver extract.

Control animals received (1) a fully curative dose of 5 gm. cabbage in addition to the basal diet; (2) basal scorbutic diet only. The animals were killed on the 14th day and histological examination made of the teeth and ribs. It was found that 5 c.c. of the extract compared closely with 1 gm. of cabbage, while, by the second method, the minimum protective dose lay between 5 and 10 c.c. of the extract.

Comparisons were made of the vitamin C content of (1) fresh sheep liver, (2) liver frozen at an average temperature of —19° stored for 6 days and then thawed, and (3) liver frozen at an average temperature of —19° and stored at this temperature for 6 months. There was a definite loss of antiscorbutic activity from liver stored at —19° for 6 days and then thawed, 10 c.c. of the extract being insufficient to prevent histological changes in the teeth. The loss after freezing for 6 days is much less than that observed in the liver stored at —19° for 6 months, 5 c.c. of the aqueous extract of the former being equal in effect to 10 c.c. of the latter.—Judith Isobel Mills, *Biochem. J.* 26:704, 1932.

The Relation of Bovine Mastitis to Human Infection—The common disorders incident to lactation in the milk secreting organ of the bovine are analogous to those in the human with certain differences. In human cases of mastitis, the staphylococcus is said to be the usual invading organism, while the streptococcus is less frequently associated with this condition. The reverse seems to be true in bovine mastitis.

In New York State nearly half the cases of all diseases which have occurred

in some 100 milk-borne outbreaks during 15 years have been associated with 10 septic sore throat epidemics. Six of these epidemics have been traced to herds in which cases of mastitis were found. In the more recent epidemics hemolytic streptococci were found which closely resembled organisms isolated from human cases. It is suggested that organisms from human sources are primarily responsible for all the epidemics of septic sore throat and scarlet fever in which mastitis is a factor.

Since January 1, 1924, in New York State there have been six outbreaks of gastroenteritis totaling 357 cases traced to the use of raw milk from cows suffering from mastitis. The types of streptococci which are the common incitants of bovine mastitis apparently are not infective for man, but when present in milk in large numbers, with their toxins, may be responsible for severe toxic disturbances, especially in children.

Bovine mastitis is a major problem in prevention of milk-borne infection.

Organisms of animal or human origin, pathogenic for man, such as the tubercle bacilli, *Brucella abortus*, and hemolytic streptococci, may be present in diseased udders. Udders infected with *Brucella abortus* may excrete the organisms during the life of the animal. Agglutination and complement fixation tests on milk from infected and uninfected quarters have given positive results and negative results respectively. Agglutinating power in the blood may be due to infection localized in the udder.

The author concludes that pasteurization is the only practical safeguard. —Paul B. Brooks, *J. Prev. Med.* 6:111 (Mar.), 1932.

The Influence of Diet on Caries in Children's Teeth—This is a preliminary report of a long-time investigation conducted upon about 400 children in three institutions to determine the effect of additions of vitamins A and D to the customary diet on the teeth during and after development.

The general plan followed consisted in adding to the diet of all of the children in one institution cod liver oil, in another treacle (molasses), and in another olive oil. At a later stage the children in the third institutions were divided into two groups, one of which received untreated olive oil and the other the same quantity of olive oil to which radiostol (irradiated ergosterol) had been added. Quantities of the various supplements were adjusted to the ages of the children.

Each child was given a detailed dental examination at intervals of 6 months. The present report deals only with the number of erupted teeth and the presence and extent of caries in the teeth erupted at the beginning of the investigation. A period of 2 years was covered in the first part of the investigation and 1½ years in the comparison of olive oil with and without vitamin D.

The data which were treated statistically showed that in the groups of children, numbering from 65 to 86, in the comparison of cod liver oil, treacle, and olive oil, the progress of caries in the permanent teeth was significantly retarded in those receiving cod liver oil as compared with those receiving the other two supplements. The increase in caries in the vitamin group during the period, whether measured by incidence or extent, was only about one-third that in the other two groups. In the two groups of children, numbering 82 and 79, respectively, receiving olive oil alone and supplemented with vitamin D, the progress of caries in the permanent teeth was also significantly retarded in the vitamin group. With suitable allowance for the shorter time there seemed to be no appreciable difference in the rate of increase of caries

in the group receiving cod liver oil (vitamins A and D) and radiostol (vitamin D).

These findings are thought to justify the conclusion that the potent factor in retarding the development of caries in fully, or nearly fully, calcified teeth is vitamin D.—N. G. Bennett *et al.*, Great Britain Med. Res. Council, *Spec. Rep. Ser. No. 159*, 1931, p. 19, figs. 3). Abstract *Exper. Sta. Rec.*, 67:341 (Sept.), 1932.

CHILD HYGIENE

TUBERCULOSIS IN CHILDHOOD

THE prevention of tuberculosis continues to be one of the major problems of public health. At present considerable attention is being focused on childhood tuberculosis. The principal sources and modes of infection have become well known during the 50 years since the discovery of the tubercle bacillus by Koch. An enormous amount of study has been devoted to problems connected with the origin, spread, and prevention of the disease. Since measures for its prevention have been applied more intensively, there has been a gradual reduction in the death rate from tuberculosis, more marked in the younger age groups. While this is true, it still remains one of the important communicable diseases affecting children, especially in the preschool age and during adolescence. While the death rate during the preschool period is relatively low, the rate of infectivity is very high. A great deal of data has been accumulated on this point since we have been applying systematically the tuberculin test and the X-ray.

On the other hand, while there has been a diminution in the tuberculosis death rate between 15 and 25 years of age, this has been most marked in the male. Females between these ages have not shown this decided decrease. This was clearly pointed out by Howard Whipple Green in his *Graphic Analysis of the Trends in the Tuberculosis Death-Rate*, which report was published in March, 1927. Since that time a number of other studies have confirmed his observations. Recent attempts have been made to determine the exact cause for this lag in the reduction of the tuberculosis death rate among young women.

Kendall Emerson, in a summary of the outstanding facts concerning tuberculosis [1] says that:

1. One out of every 5 persons who die between the ages of 15 and 45 dies of tuberculosis.
2. One out of every 3 young women who die between the ages of 15 and 30 dies of tuberculosis.
3. Tuberculosis kills more children under 21 than any other communicable disease.
4. It is estimated that 2,000,000 children have been infected with the germs of tuberculosis—and it is from these children that most of the active cases will come in later years.

The foci of tuberculous infection are mainly two, the tuberculous individual disseminating the organisms largely from the respiratory tract, and the tuberculous cow contributing the organisms directly through milk from diseased udders or indirectly from milk infected by the tubercle bacilli lodged in dust from infected excreta. Undoubtedly bovine infection is becoming less and less common in this country, as pasteurization and boiling of the milk before giving to children have become more widespread.

The campaigns for the eradication of

tuberculosis among cattle and the more rigid application of pasteurization undoubtedly have been responsible largely for the reduction in the amount of bovine infection. There is no question that tuberculosis of the bones and joints and of the cervical lymph glands has decreased markedly in this country within the last 25 or 30 years. However, we still have reports from other countries, notably certain parts of Canada, Great Britain, and Scotland, which still show a considerable proportion of children infected with bovine tuberculosis. We, therefore, should not cease in our efforts to eradicate the tubercle bacillus in cattle while we are engaged at the same time in a more active struggle against infection of children from tuberculous contacts in their home environment. Kendall Emerson further warns us that "Optimistic prophecies about the early eradication of the disease are not only a disservice to the community, but are not borne out by facts."

A recent study of tuberculosis mortality among young women [2] confirms former observations and also brings out some very interesting correlations.

> This failure of the tuberculosis mortality among young females to keep pace with the decline in the general tuberculosis death rate, together with the fact that the peak of tuberculosis mortality for both sexes and all ages up to 65 years falls among girls from 15 to 25, is probably one of the most striking points in any study of tuberculosis deaths in the United States. Its importance is emphasized further by the fact that between the ages of 15 and 25 years the death rate among young women ranges from 50 to 90 per cent higher than among young men of the same age. . . .
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> However, the increasing disparity between the male and female rates is not, as is sometimes believed, a reflection of rising death rate among young women. . . . The death rate among females from 15 to 19 years of age has decreased by 46 per cent since 1900, and for young women 20 to 24 years of age there has been a decline of 53 per cent. . . .
>
> As far back as we have any reliable information (1900), tuberculosis has been a serious problem among young women. If we should say that tuberculosis among all groups of the population *except young women* is a *decreasingly* serious problem, we should be stating the present situation much more accurately than we do when we speak of its *increasing* seriousness among young women. The problem itself is not growing and has not been newly generated; it simply appears larger and clearer as the importance of its background fades.

The main conclusions of Miss Nicholson in this study, while not agreeing entirely with similar studies, still bring out in contrast some suggestive points which should be investigated further.

> On the whole, it is the opinion of this investigator that the problem of tuberculosis among the young women of Detroit during 1930 was primarily a problem of the childbearing period and of the period during which physical development constituted a more or less consistent strain upon the strength and general health of the young woman. The importance of such living habits as a lack of sufficient sleep, and such environmental factors as broken homes, is noticeable but seems secondary to the other elements in the situation.

Only by such studies can we hope to arrive at a complete knowledge of this protean disease.

The study by Howard Whipple Green of the situation in Cleveland does not agree with certain of the findings in Detroit. In his *Tuberculosis and Economic Strata, Cleveland's Five-City Area, 1928–1931,* Green finds enormous differences exist in the tuberculosis death rates and case rates in the various economic areas.

> The age specific death rates by sex for the low and high areas are worthy of study. In the low area the male rate is quite similar to the female rate to age 25 after which time the male rate is considerably higher. In the high area, however, these rates are quite similar throughout, both being much lower at all ages than is the case in the low area. The rates for the colored population in the low area are quite different from the rates for the white population and much higher.

His general conclusion is that "not only tuberculosis but other ills of

humanity are accentuated by economic status."

An excellent report on Tuberculosis Service for Children by Dr. Margaret Witter Barnard in the October, 1932, issue of the *Milbank Memorial Fund Quarterly Bulletin* states:

Our increasing knowledge of tuberculosis in children is opening up a highly specialized field. . . .

In order effectively to safeguard the tuberculous child, it is necessary to know whether or not there are other cases of tuberculosis in the family group and how great the risk of further exposure to infection will be if the child remains in the group. The complexity of family situations in cases of tuberculosis in children may be graphically illustrated by charts such as those given. . . . These are based on data gathered in the tuberculosis clinic services for adults and children at the Bellevue-Yorkville Health Center over a period of years. . . .

If tuberculous children are to be cared for intelligently, not only must the clinic view the problem as a family situation but the family must also be educated to a similar viewpoint. In this manner only may the coöperation of the family be secured.

The four objectives of a tuberculosis service for children are stated as follows:

1. To screen out the children with tuberculosis and to determine the significance of their lesions.
2. To plan adequate care for them, including finding the source of their infection and breaking the contact.
3. To educate the families to regard tuberculosis as a family problem and to help them make adequate plans to deal with it.
4. So to record and assemble all data that they will be available for use in further studies of the general problem.

The children's tuberculosis clinic should offer diagnostic service to children from several sources. Child contacts of patients in the adult tuberculosis service should be referred as a matter of routine to the children's service for examination. Not only is it of importance to detect all tuberculosis in this group, but also through these examinations to gain a picture of the general health problems with which the family must deal. Social agencies, school physicians and nurses will wish to refer to this clinic children who present suspicious symptoms or history of exposure. And the child hygiene services will constantly use this special service for consultation. Routine tuberculin tests, followed by X-ray examination of the positive reactors, in the infant and preschool groups will screen out a number of children who should be referred for further consultation on diagnosis and care. Although a well organized and integrated tuberculosis service for children is costly, it will show very definite results both in controlling the disease in children and as a method for case finding among the adult contacts. When funds are limited, experience indicates that two groups showing the most significant lesions, needing the most intensive care, and giving the best results are the preschool and the adolescent.

The important diagnostic procedures which should be carefully standardized and of a high technical quality are:

1. Complete pediatric examination
2. Intradermal tuberculin test
3. Flat and oblique X-ray

On these data, in conjunction with a careful history and an understanding of the home conditions of the child, will be based the disposition of the case. Because it is impossible to separate tuberculosis in a child from his general condition, the physician in charge of this service should be a competent pediatrician.

Dr. Barnard states clearly that the preschool and adolescent groups present an extremely difficult problem.

Since it is in them rather than in the 6 to 12 year old group that significant lesions requiring institutional care seem to be found most frequently.

She stresses the fact that

Experience shows that children of the school age group handle tuberculous lesions remarkably well and that intelligent home care is usually sufficient.

This fact is brought out also by Dr. W. P. Shepard in a discussion of the contribution which Lymanhurst has made to the tuberculosis movement,[3] especially from the standpoint of a public health problem. He quotes Homer Folks as saying many years ago that the main objectives of the antituberculosis movement of case finding, treatment, control of spread, and education

are the ones which we are still employing today and that practically no new major item has been added to the program. However, a great development has taken place in the application of the various technics which have been elaborated for the discovery of tuberculosis. In other words, there have been no new objectives, but numerous new methods of obtaining the objectives.

The most important development has been the recognition of the tuberculosis movement as a general public health movement. Dr. Shepard feels that one of the outstanding contributions of Lymanhurst to the antituberculosis movement was the successful demonstration of what is needed and what is possible to modify the public school curriculum to meet the health needs of the school child. He points out that

> In the tuberculosis field alone the adoption of this principle is markedly changing our administrative procedure. It completes, according to our present knowledge, the circle of tuberculosis protection thrown around the individual. Ideally, now, we have a home free from contact. Missing that, the child with early infection that threatens disease is given special care in the health-school. Missing that, the preventorium is available. Missing that, the sanatorium is available for cure.

Dr. Shepard mentions Myers' pronouncement [4] on "the necessity of applying the recognized principles of contagious disease control to tuberculosis." Myers has cited many preventable tragedies, particularly among nurses and medical students due to the neglect of well known methods of disease control. He believes that "tuberculous infection is decreasing decidedly, some rural communities showing less than 30 per cent positive reactors among their young." He believes further that "this reduction in the incident of tuberculous infection is progressive and the natural result of elimination of tuberculous milk-cows, and extensive isolation of the tuberculous human being." This, of course, places the problem largely in the hands of the epidemiologist and the clinician; although other social and economic factors may contribute to its solution.

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PUBLIC HEALTH NURSING*

A Few Gleanings from the Recent Annual Meeting of the American Public Health Association, Held in Washington, D. C.
(From a Public Health Nurse's Notebook)

School Health

In a recent study by Dr. Franzen of the American Child Health Association, only 50 per cent of children 7 or more per cent underweight were actually malnourished. This is only a little worse than bare chance.

Out of 100 cases of malnourishment only 4 were detected by the teacher. Height-weight tables detect only 12 per cent of the malnourished.

Teachers were only 13 per cent efficient in detecting dental defects, and only 15 per cent efficient in detecting severe vision defects.

The teacher's usefulness in school health work has not been exploited—her knowledge about the health of children needs to be used more by health workers. Where the school nurse has discussed a child with his teacher beforehand her home visit is much more effective. Closer coöperation between teacher and nurse improves school health work.

Dr. Phair of Toronto found in an extensive survey that the school nursing staff did not materially aid the control of communicable disease in a community, and that school health services in which public health nurses worked alone appeared to be just as effective as when the services were headed up by school physicians.

Child Welfare

Dr. Phair, in his survey, found that few of the agencies carrying on child hygiene work kept good records. Their ideas of the purposes of their service were vague; the medical and health services were not intimate enough. For the most part, the measurement of the efficiency of the child hygiene program was the number of children attending the well baby clinics. No one knew how many babies under 11 months were regularly consulting their family physicians.

Tuberculosis

Dr. Atwater of Cattaraugus County found only 1 case of manifest tuberculosis among 1,308 rural children. He recommends for a tuberculosis program in a rural area the examination of contacts of diagnosed cases and the routine examination of high school students, preferably seniors.

Violet Hodgson, R.N., said the major step for the public health nurse was the finding of adult tuberculosis cases, and one good measurement of her effectiveness was her ability to get good case histories.

Dr. Winslow of New Haven said that 40 years ago practically everyone had been infected with tuberculosis and the physiological or personal hygiene attack was necessary to help one keep up his resistance. Now since it is found that in rural communities, at least, everyone has not yet got the tuberculosis germ, the bacteriological emphasis needs to be put on tuberculosis control, that is, the prevention of the spread of the disease.

E. F. M.

WHEN PUBLIC HEALTH NURSES WRITE PAPERS

Sitting through a season of innumerable annual meetings of various health

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

and nursing organizations at which public health nurses have read papers, puts one in a position to make some observations on these papers and their failure or effectiveness in creating the interested attention of the listeners.

There are four kinds of writing—descriptive, narrative, argument, and exposition. "Entertainment is primarily the aim of narration and description; instruction is the main purpose of argument and exposition." Most professional papers are expository—they explain something—they impartially unfold a generalization to the understanding of the listener.

On its structural side a successful paper is dependent upon careful selection and clear arrangement of material and adequate amplification. It is usually on this last feature that public health nurses fall down in their papers.

The most important method of amplification in expository writing is *reducing generals to particulars.*

Exposition deals largely with the abstract and the general. The full meaning of the general and the abstract is usually not clear, and clearness is the *sine qua non* of expository writing. Hence the writer must take pains to avoid excessive abstraction by giving the specific details upon which his generalizations are based. General facts must be amplified by enumeration of particulars enough to make conclusive ground for the assertion of it; general principles must be amplified by instances and examples in order to make clear the character of them. It is a good rule for expository writing, and one that the young writer will do well to adopt literally, to follow every general statement with particulars and details, with specific examples or concrete illustrations, or comparisons and analogies with what is known and familiar. "Abstractions produce very little or no effect until translated into concrete," says Lamont. "If the writer does not translate them the reader must; and this task makes hard reading." Concreteness, therefore, is very important in expository writing, both for clearness and interest.

Public health nurses can draw from such a wealth of interesting incidences in their experience that they never should have any difficulty in backing up any generalization with a concrete illustration. A public health nurse who had been particularly effective in assisting the state sanitary engineer to get people in her county to see the need of a sewage plant and sanitary privies in her county seat and several other towns in her county which had been having a consistently high typhoid fever morbidity and mortality rate, was asked to be on a state health officers' annual meeting program to tell how she did it. Instead of giving concrete incidences of problems she encountered and overcame, she spent the whole time telling what she would do if she ever started over in a new county—how she would work with the medical profession, develop group leadership among various clubs, etc. Not one point that was made could be remembered from her paper. She lost a valuable opportunity and actually bored her listeners.

Elma Rood, of Detroit, who read a paper on "The Part the Laity Plays in a Rural Child Health Program" at the recent American Public Health Association Meeting in Washington, D. C., illustrated this point on the positive side. Toward the end of her paper she told about Pumpkin Creek's loan closet, how the children in Sleepy Hollow were transported to the dental clinic at a neighboring center, how the preschool children with the mothers were given a "party" at an isolated rural school, and while there were given complete physical examinations. Long after the generalities in this paper are forgotten those who heard it will remember these concrete examples of effectiveness of the child health program—and they will remember the general principles involved by deductions from them.

Public health nurses are not the only ones who fail in amplification, but that's another story.—Maurice A. Fulton, *Expository Writing*, Macmillan Co.,

1926, pp. XIII, XV, XVII, XX, XXVII, XXXIV; Elma Rood, Participation of Lay People in the Promotion of a Rural Child Health Program, *A.J.P.H.*, XXII, 10:1030–1032 (Oct.), 1932. E. F. M.

NURSE FELLOWS OF THE A.P.H.A.

Public health nurses have often been criticized for taking too narrow a view of public health, of thinking their own contributions to a community paramount, to the exclusion of all the other public health workers. They are closely allied with the whole nursing group through membership in district and state nursing associations and in the American Nurses' Association; they are members (we hope) of their special group, the National Organization for Public Health Nursing, but these affiliations are not enough. Public health nurses need to be tied up in some way with the broader field of public health of which they are only a part, by membership in the American Public Health Association, the oldest unofficial public health organization in America. This Association has 9 active sections besides that on Public Health Nursing, and reading the official magazine of the Association and attendance at its annual meeting offer unparalleled opportunities to a public health nurse to get a broad perspective of the whole field of public health.

Since the objective of the public health nurse is " the satisfactory adaptation of the individual to an environment that makes health possible " how can she do without the contributions of the different sections of the A.P.H.A.—Health Officers, Laboratory, Vital Statistics, Public Health Engineering, Industrial Hygiene, Food and Nutrition, Child Hygiene, Epidemiology, and Public Health Education? She needs to belong to the Public Health Nursing Section of this organization to insure the integration of public health nursing with these other branches of public health.

There are already around 500 nurse members of the A.P.H.A. Public Health Nursing Section, and out of some 15,000 public health nurses in this country there should be more. However, there are very few Fellows in the Public Health Nursing Section. Public health nurse executives who are all more or less responsible for staff education programs should all be Fellows. The section officers must be Fellows, and how can they be truly representative of the best in public health nursing in this country if there is a meager number of Fellows to choose from? Only a Fellow, too, can cast a vote at the annual meeting, and that means something if public health nursing is to take its place as part of a general public health program. Write to the American Public Health Association, 450 Seventh Avenue, New York, for membership or fellowship blanks.

Those in the Section who are already Fellows would do well to think about a Life Membership. E. F. M.

EDUCATION AND PUBLICITY*

The Health Education Institute—The first response to the announcement was a surprise to all concerned. The number and the representative character of those enrolled gave evidence of a high grade personnel engaged in health education activities. We now *know* that the most experienced of the workers have that will to learn.

Extracts from the factual material will be given in this department in future issues.

A Question of Ventilation—Does the practicability of ventilation need ventilating?

Can health educators make much progress without attention being given to methods for control of heating and ventilating homes, offices and meeting places?

What is the use of talking about 68° when so many people are uncomfortably cold at that temperature?

Have any of the fresh-air workers thought out the practical problems and how to meet them?

This year a lot of people will not be over-heated in their homes. Can we help meet that set of practical problems by offering truly practical advice?

Education as It Is—Education of the individual grows out of contacts with people and things, with ideas and information.

Some of it is planned and directed, but much of it is casual and incidental to life.

In the Health Education Institute we were concerned with what touches young people and adults apart from the sharply defined and specific group found in a high school or college class.

Sometimes we teach under conditions similar to those of the classroom when we can carry out a course of study or other health project in a club, factory, etc.

It's a Long, Long Trail—In a letter received by the North Carolina Board of Health, a nurse

> . . . describing the insanitary condition and actual danger resulting therefrom in a number of the smaller schools in the section of the state she was at work in, she concluded with: "To tell the truth, the teachers are just beginning to understand sanitation. It is really the gradual process of education." . . .
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> It is a knowledge of this fact and especially the fact that it takes a long time for the masses of the people to receive and absorb sound information on these questions that makes it so important at the present time that no ground be lost which has been attained toward this end.—
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> *Health Bulletin*, North Carolina Board of Health. Oct., 1932.

Community Health Organization—"Education of the public in the principles of healthful living and disease prevention is a most important function of the health department." These words introduce the chapter on "Popular Health Instruction" in *Community Health Organization*, the revised edition of the manual of administration and procedure for cities. In a dozen pages we have a concise summary of the essentials in program planning and execution which serves as a guide to a critical review of the present health education work of a department, as well as a framework for an adequate program.

A significant detail is the reminder

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

that "an adequate popular health instruction service calls for a trained technician with a salary commensurate with the responsibility and training demanded."

We wish that more had been said about the position of leadership which the department should hold in cities where various agencies are doing health education, and how the department might effectively coördinate all local activities in this field with economy and increased effectiveness. The chapter on "Voluntary Health Service" has several paragraphs on this important subject.

Every staff member of a health department or a private health agency should read the entire book for the perspective of the whole field. The book is edited by Ira V. Hiscock, and published by Commonwealth Fund, New York. $2.00.

When Doctors Advertise—"A preliminary review of recent advertising concerning medical service and public health, conducted by county medical societies, public health agencies, hospitals, clinics, and business organizations," is *Medical Advertising*, by Mary Ross, issued by Julius Rosenwald Fund, Chicago. 72 pages. *Free.*

"Advertising may be taken to mean the use of a certain amount of purchased space or time to inform the public as to something which the purchaser believes the public needs or may desire." Much interesting information is given about advertising experiments by medical and dental societies. Advertising in periodicals by a group of ethical business firms to emphasize the services of the medical profession is described.

The chapters devoted to public health agencies have almost nothing to do with "advertising" and less with paid advertising, except in the case of the Public Health Institute of Chicago and the Life Extension Institute of New York. The picture of "advertising" is blurred by the inclusion of non-advertising forms of health education and publicity. A smaller pamphlet would have been more useful.

The reader of the report should bear in mind the wide difference between advertising to promote use of the services of physicians, and advertising for the promotion of health habits or maintenance of health agencies; and the different significance of paid space and of contributed advertising space in newspapers or magazines.

A Use For Your Ideas—Ideas for cartoons on public health can be passed on to some of the syndicates supplying cartoons to newspapers. Ideas for newspaper and magazine articles have a chance for hopeful consideration. Any form of factual or illustrative material which might be used by writers is earnestly requested.

Please send any of the above mentioned material to Paul Komora, National Committee for Mental Hygiene, 450 7th Ave., New York. Mr. Komora is chairman of the Health Section of the United Educational Program. This is the committee responsible for the public health numbers of the bulletin series, "Behind the Front Lines" mentioned elsewhere.

"Fighting" For Health Department Budgets—Depression effects on health department budgets were treated in a general session at the Washington meeting of the A.P.H.A. Several speakers referred mildly to the need of interpretation or explanation. A strong appeal was made for a "fighting" attitude toward budget cuts. One state health officer related his successful dealings with several political leaders. No one explained how to "fight" against budget cuts. No one suggested that it was more than a one-man job.

There was no indication that the maintenance of the health department is a community job, nor that the health officer might and should share with the citizenry the responsibility of meeting budget reductions.

What can be said for a health department? Almost anyone will grant that it is important, very important. Most people know about many of its activities. But what can be said in favor of its budget, even in normal times? What ideas or arguments can be offered? What evidences of its value can be offered?

How can the community be led to accept responsibility for health department maintenance? What particular groups should be cultivated and informed? What is desirable and practicable in the way of a council, committee, or other organization relationships?

The recreation and character-building agencies faced a similar problem last winter. A committee was formed by the Social Work Publicity Council. This committee and several subcommittees did some hard work. They dug into their philosophies and their publicity in search of what they had a right to claim would be convincing. They analyzed doubts and objections and stated their answers. They searched for the best statements made by various authorities.

They put this material into form for a meeting last spring, and then issued a pamphlet for wide use by those who are raising funds and explaining work for young people to local communities.

Should we do something similar for public health?

How Do You Use Them?—The series of bulletins of material for producing publicity, "Behind the Front Lines," has gone to all community chests. Some national agencies have sent their special bulletin to locals in their field. Ask your national, or send 10 cents for single copies, $1.00 for the series, to Association of Community Chests and Councils, 420 Lexington Ave., New York. Titles: Public Health Nursing, Tuberculosis, Hospitals, Nutrition, Child Health, Social Hygiene, Mental Hygiene, Recreation and Character Building, Transients, Social Case Work, Emergency Relief, Protective Measures for Children.

How have you, or the chest, or any other agency used any of the material in those bulletins? Please send samples. Please also send suggestions for preparing better material for local use.

All Should Know the Facts—Says Dr. John Sundwall, University of Michigan:

In addition to specialists in adult and child health education, all public health work must be permeated with the idea, function, scope, and importance of public health education. Today it is just as important for all public health workers to have an appreciation for and a general working knowledge of public health education as it is for them to know about water filtration, sewage treatment, nutrition, mental hygiene, and related subjects.

Hence public health education not only requires experts, but it must become one of the working tools for all public health workers. Already attention has been called to the importance of adequate training, on the part of the public health educator, in those basic sciences which acquaint one with the structure, functions, and care of the human body. The first principle in all public health education is knowledge of the facts involved in the promotion of health and the prevention and control of communicable diseases. Far too much of our public health education of today includes opinions and empiricisms. This is due largely to our innate tendency to react emotionally toward our human make-ups, whether in order or out of order. What we feel to be a good health practice we are prone to pass along as a scientific dictum. Moreover, there is that emotional proclivity to adopt and follow the single-track mind in matters pertaining to

health. Hence fads and hobbies may permeate health practices and public health education.

The public health educator should and must know the facts—not only the established facts, but also the new facts which are contributed almost daily through research and investigation. The second principle in health education is to know how to present these facts to the public—adult and child—and to present them.—

In "Public Health Education: The Functions of the University and the Private Foundation." *Public Health Reports*, Washington. Oct. 7, 1932.

Includes, what the university does; "The Functions of Nonofficial Health Agencies"; "Official Versus Nonofficial Health Agencies." All good for all of us to read all of it.

MOTION PICTURES

Health Officer Frank Osborne, East Orange, N. J., with the active collaboration of two board members has a motion picture presentation of the department activities. On narrow film this picture was quite inexpensive to produce and promises wide usefulness. An extensive schedule of local showings has been worked out.

At Washington the Metropolitan Life Insurance Company presented a new talking picture which will be described next month.

The American Journal of Cancer is offering, without cost, a series of motion picture films on cancer for showing before medical groups. The films now ready for distribution are "Cancer of the Skin," based on material gathered by Dr. Joseph Colt Bloodgood and Dr. Charles F. Gerschicter of Johns Hopkins Hospital, and one showing "Technical Methods of Cancer Research," taken at the Institute of Cancer Research, Columbia University. The films are obtainable in either 16 or 35mm widths, and are adequately titled so that no explanation is required while they are being shown. They are available for use in the United States only. Full information concerning the films can be obtained from the Motion Picture Department, *American Journal of Cancer*, 1145 Amsterdam Ave., New York, N. Y.

DEPRESSION

"Observations on the Depression and Public Health," by Dr. D. B. Armstrong. Reprint from *Medical Journal and Record*. How depression does not affect public health, and how it does do so. *Free*. From Metropolitan Life Insurance Co., New York.

"Depression Death Rates." Editorial. *Journal* of American Medical Association, 535 N. Dearborn St., Chicago. Oct. 15, 1932. *Free* copy in Clip Sheet for Editors. A readable interpretation usable in many ways.

Birmingham's Health, Jefferson County Board of Health, Birmingham, Ala., had a cover-page cartoon supplied by the Health Education Service of the A.P.H.A. illustrating "depression economy" as "one more obstacle on an uphill road." The Health Department is a big truck loaded with boxes and bundles representing "vital statistics," "education," "clinics," and so on. Big rocks in the road are "indifference," "carelessness," "ignorance," and "delay." Beyond the rocks the truck seems stalled in heavy ruts labeled "depression economy." Sept., 1932.

BOOKS AND REPORTS

Nurses on Horseback—*By Ernest Poole. New York: Macmillan,* 1932. 168 pp. Price, $2.50.

This is a very dramatic and interesting story of the organization and work of the Frontier Nursing Service in the mountains of Kentucky. The author writes from first hand observation, having made a visit to the centers, and field trips with the nurses, and held conversations with the mountaineers. It is a story of the organization by Mrs. Mary Breckenridge of the first nursing center in 1925, and how this has grown in seven years until, " in a small central hospital and 8 outlying stations in lonely regions of the hills unreached except by mountain trails, 28 nurses with 3 supervisors serve a region covering nearly 800 square miles, in the counties of Leslie, Perry, Clay, Bell, Harlan, Knox, and Owsley."

The nurses are all trained in midwifery and public health nursing. The midwifery work is probably their outstanding service, and is in itself a pioneering field in this country. " The care of mothers and babies, though it is still their main concern, almost inevitably leads to the care of the entire family." This care includes first aid, immunization, and general health instruction for adults, infants, and children.

If to some this writing seems to be over-sentimental we must remember that the general public, for whom the book is written, likes this type of presentation. It is in no way a professional study of the service. The book is full of human interest stories which give word pictures of the characteristics and environment of the " mountaineer." In reading one follows the " Nurses on Horseback " over rough mountain trails, day and night in all kinds of weather. Interesting illustrations add completeness to the word pictures.

All who read will enjoy this book, and we hope it may help in interpreting to the public not only the work of the " new pioneers on old frontiers " of Kentucky, but the daily work of many public health nurses who are doing pioneer services in many localities and with many types of people, nurses whose work goes unpraised and often unappreciated.

FLORENCE E. SPAULDING

Handbook of Bacteriology. For Students and Practitioners of Medicine—*By Joseph W. Bigger, M.D. 3rd ed. New York: Williams & Wilkins,* 1932. 459 pp. Price, $5.00.

The first issue of this book was January, 1925, since which two editions and one reprinting have been required. The book is one of the best of its class, well written and well expressed. A criticism that can be made is that it is too devoid of history. The organisms discussed have the name of the discoverer and the date of the discovery, but little or nothing more. The discovery of the anthrax bacillus is credited to Robert Koch in 1876, yet the organism was discovered in 1849, and in 1863 experimental infection with animals was done. It is also stated under Anthrax that the serum of Sclavo is the best. The author apparently has not heard of the improved serum developed by Eichhorn at the Bureau of Animal Industry in this country, which is considerably more potent than that recommended.

Under the head of immunity, the author has given very little space to Erlich's side chain theory for which he

expresses regret. We believe that his reasons for leaving it out are sound, though we miss it and still hold the opinion that for teaching purposes it has great value. The book is well printed and illustrated.

MAZŸCK P. RAVENEL

Labor Problems and Labor Legislation—*By John B. Andrews, Ph.D. (4th ed.) New York: American Association for Labor Legislation,* 1932. 135 pp. Price, cloth, $.60; paper, $.30.

This is the fourth revised edition of a standard treatise on labor legislation. In addition to cogent material on wages, hours of labor, collective bargaining, social insurance, and law enforcement, it sets forth guiding principles to make industry reasonably safe from accidents, and workers free from preventable diseases. The book is well printed, but has no index, and some of the many illustrations seem to have been inherited from earlier editions, in fact, from very early ones. Sanitarians interested in industrial hygiene and the prevention of occupational diseases will find this booklet of interest. JAMES A. TOBEY

Hygiene, A Textbook for College Students—*By Florence L. Meredith, M.D. Philadelphia: Blakiston,* 1932. 802 pp. Price, $3.50.

This book is designed as a textbook in hygiene for students of the college level. It is the second edition, which has been revised and the contents rearranged.

The text is divided into 5 parts: Part I, on the need of teaching hygiene to students of the college level; Part II, devoted to human anatomy and physiology; Part III, pathological conditions; Part IV, the various phases of personal hygiene and Part V, the discussion of mental hygiene.

Part II devotes 160 pages to anatomy and physiology. While some basic scientific information is necessary as a foundation for teaching health, there is some question whether any such proportion of a college course in hygiene, where the major aim is that the students may understand and practice healthful living, should be given to these subjects. Over 90 pages (Part III) are devoted to discussion of disease conditions.

The bibliography is placed at the end of the book. This would be more likely to be used if placed at the end of each chapter.

Some would question the desirability of segregating anatomical, physiological, and pathological material in definite large sections in the text. A more intimate nearness of the discussion of normal conditions, and of the pathological results of errors of living, to the discussion of the prevention and cure of faulty health by right living, would seem a more interesting and usable arrangement.

Of the 802 pages of the main text, a little over one-half are devoted to the discussion of various problems of hygiene and right living.

In spite of the heavy emphasis on technical anatomy, physiology, and pathology, this is one of the few good texts on hygiene, planned for the college level. Those considering the adoption of a college-level textbook in hygiene should give this work serious consideration. CHARLES H. KEENE

House Design, Construction and Equipment, *The President's Conference on Home Building and Home Ownership. Washington, D. C.* Price, $1.15.

This volume, published as a result of the President's Conference on Home Building and Home Ownership, covers the design, construction, and fundamental equipment of the home. The problems of the designer are to distinguish essentials from nonessentials,

to plan efficiently for the most economical use of materials, and to make the small homes attractive in their mass as well as in proportions and detail. In these problems the designer needs the coöperation and help of the builders, contractors and the manufacturers of material and equipment.

The Committee on Construction emphasized the necessity for more widespread use of the best building practices; helps to protect the home buying public against "jerry" building; and the need for search and research for new and better materials and methods. Fundamental equipment in homes of today is superior to that in those built in the past. Devices for heating, lighting, plumbing, refrigeration, and ventilation have undergone remarkable developments in the past few years. The Committee on Fundamental Equipment considered standards, location, and installation of such equipment. Its report brings together a summary of information of great use to every builder, owner, or renter, and throws light on relative values and best uses for equipment now on the market.

ARTHUR P. MILLER

Negro Housing. The President's Conference on Home Building and Home Ownership. Washington, D. C., 1932. *A Report of the Committee on Negro Housing. Prepared by Charles S. Johnson.* 271 pp. Price, $1.15.

Public health opinion tends more toward considering environmental factors as being responsible for the high morbidity and mortality rates among negroes than toward the view of the existence of some peculiar racial susceptibility on the part of these people. Important among these causes is that of the widespread poor housing that affects negroes in both rural and urban centers.

The problem of housing among negroes is complicated by that of race relations. Indeed there are few if any situations of community adjustment involving this race which are not profoundly influenced by inter-racial complexities. This makes necessary the provisions for special studies in reference to the negro if a comprehensive conception of his problems and their connections with those of other racial groups is to be secured. Recognizing this fact the President's Conference on Home Building and Home Ownership set up a committee to make special investigations and analysis of the status of negro housing. The results presented in this volume are a synthesis of facts and their influence entering into this situation. The treatment is candid, broad in conception, and informative. It marks an advancement toward a better understanding of a difficult social condition. The presentation should be of value to public health workers despite the brevity of treatment of the health of the negro and his housing (page 57). The health inferences that may be drawn from the facts are bound to impress those interested in public health.

FRANKLIN O. NICHOLS

Growth and Development of the Child—Part III—Nutrition. *A publication of the White House Conference on Child Health and Protection. New York: Century,* 1932. 532 pp. Price, $4.00.

This book is one of the four volumes prepared by the Committee on Growth and Development of the White House Conference on Child Health and Protection. The main object of the committee was to appraise the existing knowledge of growth and development of children from conception to maturity. The present volume is an exhaustive consideration of our present-day knowledge of nutrition in relation to growth and development. The thoroughness of the investigations

which form the basis of this volume is attested by the character of the investigators who presented various phases of the subject. It is really a compendium of our present knowledge and investigations of practically every phase of nutrition. The chapter on "Optimal Growth and Nutrition" corrects many erroneous views which have been held since height and weight standards have been used extensively in the schools. Each chapter is followed by a list of up-to-date references.

RICHARD A. BOLT

The Crisis in Hospital Finance—*By Michael M. Davis and C. Rufus Rorem. Chicago: University of Chicago Press,* 1932. 241 pp. Price, $2.50.

One might cavil at the title though hardly at the contents of this timely review of the economic progress of voluntary general hospitals towards bankruptcy. We see the progress of long time policies leading to the apex of a dilemma, the solution of which involves a lot of rationalization, hard thinking, and close figuring by the holding corporations, commonly thought of as beneficent hospital trustees, by the necessitous public, that is, patients demanding instant attention, and by the physicians who serve on organized and courtesy staffs of hospitals.

There are no better documented authors on hospital economics, and the social implications of hospital costs and financial resources, nor any more widely familiar with the trends and tendencies in the conduct and support of hospitals in the United States than are Michael Davis and Rufus Rorem.

To those familiar with passing events as contributing public, the sick, and the doctor, hospital services, and what they cost, nothing of great novelty or originality appears in the twenty-one chapters of this book, but only particularly well informed and persistent students of hospitalization problems will have been so fortunate as to have at hand and in logical sequence the excellent series of addresses and other documents here assembled on one theme.

The rapidly broadening reading public concerned seriously with correcting the errors of medical care and cost distributions, developed by the activities of the Committee on the Costs of Medical Care, will find much similarity between the facts and opinions here offered and the contents of many of the publications already issued by the committee.

After a description of the general situation which includes a summary of hospital facilities, capital investment, percentage bed use, and cost of maintenance of the hospitals of the United States, we are carried with generous but not elaborate tables and discussion through the economics of hospital care, the more pressing problems of hospital finance, of the depression era in particular, and finally to a somewhat philosophical consideration of the issues at stake and the experiments already under way toward solution.

Community Chest executives as well as hospital boards and county medical societies will find this book indispensable as a source of authentic information and sound policy, to say nothing of hospital superintendents, accountants, and public health councils and relief agencies.

HAVEN EMERSON

Obstetric Education. *Report of the Sub-committee on Obstetric Teaching and Education of the White House Conference on Child Health and Protection. New York: Century,* 1932. 302 pp. Price, $3.00.

The Committee on Prenatal and Maternal Care of the White House Conference is to be congratulated upon this comprehensive study of obstetric education in the United States. The convic-

tion is growing that the main key to the prevention of maternal and early infant mortality rests in the hands of the well-trained obstetrician and midwife. This report considers every contingent phase of the subject and gives, in clear-cut recommendations, the steps which should be taken to improve obstetric education in this country. The parts on obstetric education of nurses and attendants, and on education of midwives should receive careful consideration. The education of the laity and social workers has been given special attention. The arrangement of the book is well fitted for reference purposes. RICHARD A. BOLT

Preventive Medicine—*By Mark F. Boyd, M.D. 4th ed. Philadelphia: Saunders,* 1932. 532 pp. Price, $4.50.

The fourth edition of this book, which is reset, proves that it has made a place for itself with teachers and those interested in public health. It has been brought up to date in almost all respects, though we fail to find any reference to psittacosis, which has become a public health problem in this country. The chief changes have been in the sections on milk supplies, water, and sewage disposal.

The book is well printed and abundantly illustrated, and will doubtless continue to hold the place it has won and occupied for 12 years.

MAZŸCK P. RAVENEL

Sanitation Manual for Ice Cream Plants—*Prepared by the Research Committee of the International Assn. of Ice Cream Manufacturers, Harrisburg, Pa. Special Bulletin No. 38.* 120 pp. Price, $1.00.

Health departments have always placed particular stress upon regulation and sanitary control of milk and cream supplies. Milk products have received secondary consideration, and this has been more or less true of ice cream. The results of this attitude have been exactly what would be expected, *i.e.*, that the milk industry has been educated to a high degree in the science of sanitation as applied to the food industry while the ice cream industry has not had the same advantages.

With an apparent realization of the situation the ice cream industry has, through the International Association of Ice Cream Manufacturers, done a laudable piece of work in the preparation and publication of two pamphlets designated as *Special Bulletin No. 21, Sanitary Regulations for Ice Cream,* and *Special Bulletin No. 38, Sanitation Manual for Ice Cream Plants.*

Bulletin No. 21 was prepared in December, 1929, by the Committees on Sanitary Control of Ice Cream of the International Association of Dairy and Milk Inspectors and the International Association of Ice Cream Manufacturers. It was intended "for use of regulatory officials in the preparation of laws governing the manufacture and sale of ice cream and similar frozen foods, and as a guide to manufacturers in the operation of ice cream plants." The bulletin contains definite requirements in the form of a 10-section law and covers essential factors such as definitions; permits; premises; equipment; cleaning equipment; canning and packing ice cream; containers, packers, etc.; ingredients; pasteurization; and personnel; and also sanitary regulations for dealers and vendors of ice cream.

Bulletin No. 38 was prepared by the Research Committee of the International Association of Ice Cream Manufacturers. The purpose of this *Sanitation Manual* is to assist ice cream plant operators to conduct their plant operations so as to comply with the terms of the sanitary code contained in *Bulletin No. 21,* and also to assist regulatory officials in their work. For the purpose of inspection record a "yes"

and " no " appraisal form is contained in the manual. The manual contains all of the provisions of the sanitary code and in many cases specific directions for carrying them out.

Food control officials interested in the sanitary control of ice cream supplies can gain much useful information from these bulletins and will find them essential in their work. Copies of the bulletins may be secured free by public health officials by communicating with Robert C. Hibben, Executive Secretary, International Association of Ice Cream Manufacturers, Harrisburg, Pa.

WILLIAM B. PALMER

Emergency Work Relief—*By Joanna C. Colcord, Assisted by William C. Coplovitz and Russell H. Kurtz, Russell Sage Foundation, New York,* 1932. 286 pp. Price, $1.50.

This volume deals primarily with methods of administering work relief, and offers suggestions for those who are faced with the problem. Material for this study was collected from 26 American cities during the summer and early autumn of 1931 in response to a request from the President's Organization on Unemployment Relief. It was the aim to select projects in communities both large and small, conducted under a variety of auspices, public and private, and attended with varying success.

The book is divided into three parts, the last part perhaps containing the most constructive suggestions for community action. Part I deals with the development of work relief. Here are described legislative factors and methods of administration in the past. In at least 14 of the 26 programs described, the workers were protected by compensation insurance. In Grand Rapids, Milwaukee, and Niagara Falls, a medical examination was given before men were assigned to work.

Part II deals individually with reports on work relief in 26 communities. From these reports, one is struck with the diversity of the inception, development, and conduct of work relief in the cities studied. Part III discusses the concepts underlying work relief and suggests methods of setting up a program. Several departments of municipal administration, as well as persons engaged in problems of relief and social service, will find must of interest in this timely volume.

IRA V. HISCOCK

The School Health Program. *A publication of the White House Conference on Child Health and Protection. New York: Century,* 1932. 400 pp. Price, $2.75.

The report on *The School Health Program* is the most voluminous which has arisen from the White House Conference. It opens with a statement of the philosophy of education prepared by Professor William H. Kilpatrick. This is followed by a series of summarized reports of 24 sub-committees dealing with such subjects as the present school health activities; the school plant; mental hygiene; medical, dental, and nursing services; nutrition work in the schools; various phases of health education as applied to the elementary and secondary schools; social hygiene; physical education; etc. Special attention is given to problems of health in rural, negro, and Indian schools. A program of health for the parochial schools also is outlined. Due attention is given to the professional education of teachers and leaders in health education; and the importance of health service in teacher training institutions is stressed.

Under the able chairmanship of Dr. Thomas D. Wood, we have presented here a most comprehensive summary of the extent and diversity of school health problems. A composite review of many phases of the health and protection of school children is brought out by the

reports of various members of the subcommittees. This report forms a very useful background against which every progressive school system should check its actual accomplishments.

RICHARD A. BOLT

The Modern American Family—*Donald Young, Editor. Annals of the American Academy of Political and Social Science.* Vol. 160. *Philadelphia,* 1932. 256 pp. Price, $2.50.

The student of the social and economic status of the family and its interrelations as the basic institution of modern society will find many valuable discussions collected in this volume. The papers edited by Donald Young, Ph.D., assistant professor of the Department of Sociology of the University of Pennsylvania, have been contributed by outstanding sociologists, psychologists, statisticians, specialists in welfare work, and clinicians.

The papers have been classified under three headings: The Heritage of the Modern Family, The American Family in Transition, and Efforts at Family Stabilization. Several of them touch upon the public health aspects of modern family life and the remedial agencies that have been established for improving the standard of American family life.

This book is especially valuable to the student of sociology and to welfare workers. It is well arranged, contains a helpful book department and index to subjects and names.

A. B. TOWSE

BOOKS RECEIVED

A CENTURY OF PUBLIC HEALTH IN BRITAIN, 1832–1929. By Harley Williams. New York: Macmillan, 1932. 314 pp. Price, $2.50.

APPLIED BACTERIOLOGY. By Thurman B. Rice. New York: Macmillan, 1932. 276 pp. Price, $2.50.

MY HEALTH HABITS. Book IV. By Charlotte Townsend Whitcomb, John H. Beveridge and Evelyn Townsend McCrory. New York: Rand McNally, 1932. 249 pp. Price, $.88.

HEALTH STUDIES. By F. M. Gregg and Hugh Grant Rowell. Yonkers: World Book Co., 1932. Home and Community. 258 pp. Price, $.76. Personal Health. 314 pp. Price, $.84.

THE NEW HEALTHY LIVING SERIES. By C.-E. A. Winslow and Mary L. Hahn. New York: Merrill, 1932. The Game of Healthy Living. 216 pp. Price, $.64. The Habits of Healthy Living. 218 pp. Price, $.64. The Laws of Healthy Living. 249 pp. Price, $.64. The Healthy Community. 266 pp. Price $.68.

OUTWITTING OUR NERVES. 2d ed. By Josephine A. Jackson and Helen M. Salisbury. New York: Century, 1932. 420 pp. Price, $2.50.

LIFE'S ADVENTURE. THE STORY OF A VARIED CAREER. By Elwood Worcester. New York: Scribner, 1932. 362 pp. Price, $3.00.

CHILD CARE TODAY. By Bela Schick and William Rosenson. New York: Greenberg, 1932. 320 pp. Price, $2.50.

ETHICS IN NURSING. By Gene Harrison. St. Louis: Mosby, 1932. 163 pp. Price, $1.50.

CULTIVATING THE CHILD'S APPETITE. 2d ed. By Charles Anderson Aldrich. New York: Macmillan, 1932. 137 pp. Price, $1.25.

ALCOHOL AND MAN. Editor, Haven Emerson. New York: Macmillan, 1932. 451 pp. Price, $3.50.

YOUR HEARING. HOW TO PRESERVE AND AID IT. By Wendell C. Phillips and Hugh Grant Rowell. New York. Appleton, 1932. 232 pp. Price, $2.00.

BACTERIOLOGY FOR NURSES. 4th ed. By Mary Elizabeth Morse and Martin Frobisher. Philadelphia: Saunders, 1932. 409 pp. Price, $2.50.

THE MICROBIOLOGY OF FOODS. By Fred Wilbur Tanner. Champaign: Twin City Printing Co., 1932. 768 pp. Price, $7.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Childhood Tuberculosis — The author feels that the proper handling of tuberculosis in children requires a separate clinic adequately and competently staffed, and that the problem must be dealt with from the family angle. One more perfect example of beautiful printing which every health worker should take to heart.

BARNARD, M. W. A Tuberculosis Service for Children. Millbank Quart. Bull. 10, 4:257 (Oct.), 1932.

Syphilis Control Through Treatment—What it costs to treat syphilis in the hands of the general practitioner and at the pay clinic, and the relation of this cost to the ordinary patient's ability to pay, is set forth as an important factor in the spread of the disease because of the insufficient treatment many patients receive.

BROMBERG, L. and DAVIS, M. M. The Cost of Treating Syphilis. J. Soc. Hyg., 18, 7:365 (Oct.), 1932.

Experimental Meningitis—Meningococcus antitoxin injected after monkeys had developed critical symptoms following intraspinal inoculation with live meningococci protected the animals from acute cerebrospinal meningitis. Monkeys thus immunized were resistant to later lethal doses of organisms.

FERRY, N. S. Meningococcus Antitoxin. J. Immunol. 23, 4:325 (Oct.), 1932.

Experimental Poliomyelitis—Virus passed through monkeys intensifies its infectivity and undergoes quantitative changes. Virus-serum immunity is practical but the optimum protection is yet to be determined. Monkeys refractory to nasal infection are susceptible to intracerebral inoculation.

FLEXNER, S. Immunity to Human and Passage Poliomyelitis. J.A.M.A. 99, 15:1244 (Oct. 8), 1932.

Nursing Motion Pictures—Nursing technic, both for private duty and public health nurses, is the subject of a series of motion pictures used for nurse training. The idea might profitably be put to the training of inspectors and other health workers.

GOODRICH, A. M. The Nursing Procedure Motion Picture. Am. J. Nurs. 32, 10:1029 (Oct.), 1932.

Colds and Diet—Will ultra-violet light, irradiated ergosterol, cod liver oil, really increase immunity to colds as the enthusiasts would have us think? Not generally in infants, says this author. Neither are respiratory infections frequently due to a lack of vitamin A. But a lack of vitamin C may heighten local susceptibility in the respiratory tract. There's meat in this paper.

HESS, A. F. Diet, Nutrition, and Infection. New Eng. J. Med. 207, 15:638 (Oct. 13), 1932.

High School Health Education—Demonstrations of health education as conducted in some Massachusetts high schools are described briefly and possibly too modestly.

KIERNAN, F. Health Education Demonstrations in Massachusetts High Schools. New Eng. J. Med. 207, 14:604 (Oct. 6), 1932.

Prenatal Clinic Results—This report upon 218 complete clinic cases leads to some interesting conclusions. Too many made too few visits; the routine Wassermann proved its worth; and the value of physical examination was demonstrated. There was but 1 maternal death but the neonatal deaths were high.

NICOLL, M., JR. and MARSH, E. H. Report of Two Hundred and Eighteen Completed Cases Seen at the Westchester County Prenatal Clinic in 1931. New York State J. Med. 32, 20:1180 (Oct. 15), 1932.

Possibilities of Mosquitoes Transmitting Tularemia—"It is likely that suitable conditions to effect such transfers in nature are rare, and it is probable that at most only infrequent infection of man would occur in this manner." So concludes a demonstration of the possibility of the mechanical transmission of tularemia by mosquitoes.

PHILIP, C. B., *et al.* Experimental Transmission of Tularemia by Mosquitoes. Pub. Health Rep. 47, 43:2077 (Oct. 21), 1932.

Rural Nursing—Perhaps you are too hard headed to be influenced by perfect printing and appealing pictures. This story of public health nursing in Cattaraugus County seems so utterly convincing that this reviewer, for one, begins to suspect his own judgment. Perhaps he is only charmed by the printed page, so you had best read it yourself to form your own conclusion.

RANDALL, M. G. Public Health Nursing Service for Rural Children. Millbank Quart. Bull. 10, 4:276 (Oct.), 1932.

Immunization Problems—Limitations of artificial immunization and the desirable factors in the various procedures are set forth in stimulating generalities which introduced a British discussion of these subjects.

STALLYBRASS, C. O. Problems of Immunization in Public Health. J. State Med. 40, 10:573 (Oct.), 1932.

More Bacteriological Dissociation—Dysentery type III bacilli develop rough and smooth variants, the R type being the standard for cultures used in making antiserums. But it is the S type, not the R, that appears to be resistant to the serum. This is the cause of experimental errors, conclude the authors.

THJOTTA, T. and WAALER, E. Dissociation and Sensitiveness to Normal Serum in Dysentery Bacilli of Type III. J. Bact. 24, 4:301 (Oct.), 1932.

Mental Reactions to the Depression—The effect of adversity upon frank mental pathological states is measured statistically, whereas the more significant end-results can only be surmised.

THOM, D. A. Mental Hygiene and the Depression. Mental Hyg. 16, 4:564 (Oct.), 1932.

Bacteriologic Tests of Water—Only *B. coli* type colonies in a ferrocyanide citrate agar medium are indicative of fecal pollution; *B. aerogenes* type and intermediate type colonies should not be considered dangerous; so concludes the author of this study.

TONNEY, F. O. and NOBLE, R. E. Colon-Aerogenes Types of Bacteria as Criteria of Fecal Pollution. J. Am. W. W. Assn. 24, 9:1267 (Sept.), 1932.

Water-Borne Typhoid—Causes of outbreaks of water-borne typhoid fever epidemics are set forth in interesting detail.

WOLPERT, N. N. B Typhosis is Waiting for You. Water Works Eng. 85, 19:1122 (Sept 21), 1932.

NEWS FROM THE FIELD

DELTA OMEGA HONORARY PUBLIC HEALTH SOCIETY

THE annual meeting of Delta Omega, the Honorary Public Health Society, was held in Washington, October 25, 1932, with the largest attendance in the history of the organization, including three honorary members, Colonel F. F. Russell of the Rockefeller Foundation, Dr. S. Josephine Baker, and Dr. M. P. Ravenel, editor of the *American Journal of Public Health,* and also General M. A. DeLaney, Acting Surgeon General of the U. S. Army.

Officers elected were: *President,* Dr. A. W. Freeman, Professor of Public Health Administration, Johns Hopkins University; *Vice-President,* Professor Ira V. Hiscock, Yale School of Medicine, and *Secretary-Treasurer,* Dr. W. G. Smillie, Professor of Public Health, Harvard University. Dr. James A. Tobey of the Massachusetts Institute of Technology Chapter was the retiring President.

Among other activities, the society, with the coöperation of the American Public Health Association, has republished Budd's classic work on typhoid fever, and this may be obtained by anyone interested, at a nominal cost, from the American Public Health Association, 450 Seventh Avenue, New York.

DEATH OF DR. MONGER

DR. John Emerson Monger, F.A.P.H.A., died in Columbus, O., October 28. He knew more people in the public health profession than any other one man, and probably had more intimate personal friends than any other health officer. He was a most generous man with his time, his money, and his information. There have been many stories of gameness in the arena, but never has there been a more perfect demonstration of sportsmanship than this man's life for the past four years. Beset with a chronic ailment which might terminate fatally at any moment, he never faltered in his attempt to improve the public health work of this country.

Dr. Monger was State Registrar of Vital Statistics for the State of Ohio 1916–1920, and Director of Health of Ohio 1923–1929. He was a member of the A.P.H.A. since 1923 and a Fellow since 1926. At the Washington Annual Meeting he was elected an Honorary Member of the Association. C. C. Y.

NATIONAL REHABILITATION ASSOCIATION

THE National Rehabilitation Association, which is devoted to the promotion of vocational restoration of the disabled, determined at its convention in Chicago, October 10–12, to carry on an extensive campaign to place the need for the restoration of the handicapped before the people of the country.

The Association selected as Director John A. Lapp, of Chicago, formerly President of the National Conference of Social Work. Officers are: President, Oscar M. Sullivan; Vice-President, H. D. Hicker; Secretary, Homer W. Nichols; Treasurer, LeRoy N. Koonz.

MICHIGAN WATER PURIFICATION CONFERENCE

THE Seventh Michigan Conference on Water Purification was held at Mt. Clemens October 5–7. The conference was unusual in that prepared papers were few and the members were given an opportunity for free discussion of plant problems at every session. This created an informal atmosphere

which caused many who would otherwise be inclined to refrain from comment to enter the discussion and was a condition commented upon by many who never attended before.

TEXAS ASSOCIATION CHANGES NAME

THE name of the Bexar County Public Health Association (San Antonio, Tex.) was changed by resolution of the Board of Directors at its regular meeting held in September to Bexar County Tuberculosis Association.

EXAMINATIONS OF CHILDREN

APPROXIMATELY 76,000 children entering school for the first time were examined under parent-teacher association direction in 1931. This number does not include many thousands of children of preschool age examined who did not enter school. It is anticipated by Summer Round-Up workers that the number of children examined this fall will exceed the number reported last year.

NEW YORK STATE SEWAGE WORKS ASSOCIATION

THE New York State Sewage Works Association held its Fall Meeting at Saranac Lake October 14–15, President Earle B. Phelps presiding. In the afternoon, after a brief business session, papers were presented by Henry W. Taylor; Ellis K. Phelps and Earle B. Phelps; and George Nesbit. The meeting unanimously adopted a resolution protesting against drastic or unproportionate reduction in maintenance funds for municipal sewage treatment works.

The Fifth Annual Meeting of the Association will be held in New York City in the middle of January, 1933.

CAN WE REDUCE ACCIDENTAL DEATHS?

LAST year accidents of all kinds caused 4,634 deaths in the City of New York, 1,298 of these being charged to automobiles. . . . It may be well to bear in mind that other accidents also deserve attention. Arranged in the order of frequency, and omitting accidental deaths due to machinery or to means of transportation, these other accidental deaths in New York City in 1931 were charged to the following causes:

Accidental falls and crushing	1,356
Drowning	435
Illuminating gas	305
Accidental burns	232
Acute poisoning	108
Gases other than illuminating	70
Sunstroke	66
Injuries from cutting or piercing instruments	64
Conflagration	59
Mechanical suffocation	31
Firearms	18
Injuries inflicted by animals	7

Of the 435 deaths from drowning 409 were in males. With the great popularity of bathing among both sexes it is probable that the number of lives exposed was not much if any greater among males than among females. The former, however, are more reckless and pay the penalty. An examination of the drowning deaths by age fails to show much greater frequency of this accident at any particular age period. In other words, so far as this accident is concerned the male does not appear to acquire greater caution as he grows older. In fact the rate from drowning appears to be highest among males in the age period 35 to 50. It is not a tribute to man's common sense.

When we examine deaths from accidental burns we find they are more numerous among females, 102 males to 130 females. Moreover, a large proportion of these deaths occur in children under 5, namely, 25 males and 47 females. During the next 5 years they are also quite numerous, 11 males and 16 females, but after that they drop quickly to a low point between 15 and 25 years.

Except for accidental deaths due to automobile and street accidents and to accidents caused by machinery, there is little in the way of administrative measures that can be done to reduce these unnecessary deaths. Almost entirely is it a question of educating and training the individual. Perhaps our school teacher readers can utilize the material here presented to teach the lesson.—*Weekly Bull.*, City of New York, 22:35 (Sept. 3), 1932.

DEMAND FOR VACCINES INCREASE

THE demand for vaccines and other preventive material has increased enormously during the last three years in Illinois and the trend is still upward. Since January, 1929, fully one-half million children have been immunized against diphtheria with toxoid and toxin-antitoxin furnished by the State Department of Public Health compared with 300,000 during the previous four years. Over a quarter of a million people were vaccinated against smallpox with vaccine distributed by the department, compared with less than 75,000 during the preceding quadrennial. The number of people vaccinated against typhoid fever with material furnished by the department jumped from 60,000 to 75,000 in the two periods, respectively. To determine the susceptibility of children to diphtheria the department distributed material sufficient for 135,000 and 65,000 tests during the two periods, respectively. The results of this growing demand for preventive medicine are reflected in lower prevalence rates of the diseases subject to control by these methods.—*Illinois Health Messenger*, Nov. 15, 1932.

NORTH CAROLINA WATER WORKS ASSOCIATION

THE North Carolina Section of the American Water Works Association and the North Carolina Sewage Works Association held its Twelfth Annual Joint Convention at Winston-Salem October 31, November 1–2.

RESIDENTIAL SANITATION

DR. R. H. Riley, Director of the Maryland State Department of Health, announces that the department has issued a pamphlet on residential sanitation, containing practical suggestions for solving the more important sanitary problems that affect the welfare of those living in rural homes.

A copy may be obtained by writing to the Bureau of Sanitary Engineering, Maryland State Department of Health, 2411 North Charles Street, Baltimore.

PRESERVATION OF FOOD BY DRIKOLD

IN England the government maintains a station at Cambridge where researches on low temperatures for the preservation of foods are carried out, and another station at Aberdeen, devoted to the preservation of fish. The use of solid carbon dioxide known in England as "drikold" and in this country as dry ice, has already revolutionized the methods for preservation heretofore in vogue. Dry ice is extensively used in the ice cream industry, and in the transportation of fish and other perishable foodstuffs. The researches in England have proved that meat and fish can be kept for long periods in perfect condition when stored in chambers the atmosphere of which has been displaced by carbon dioxide and which are maintained at definite low temperatures. The action of the cool carbon dioxide gas inhibits bacterial deterioration, and the meats do not suffer the deterioration caused by ordinary chilling or refrigeration. The report points out that at present meats from Argentina, Australia, and New Zealand have to be frozen to arrive in edible condition in England, but by the new process, this will not be necessary. Applied to fish, the process seems to hold even more important potentialities.

The great bulk of fish eaten in England is brought from as far north as Greenland and Murmansk, the southern waters not having been fished for this purpose on account of the impossibility of transporting the catch to England in edible condition. So far, practical methods of applying the discovery to trawlers, storage houses, railway cars, etc., have not been worked out in detail, but there seem to be no insurmountable difficulties in doing this.—*Med. Off.*, Sept. 10, 1932, p. 113.

CHILD HEALTH CENTER, ALBANIA

THE establishment of a child health center in Albania was the first step in a campaign against infant mortality. Because the methods of child care in the villages and even in the cities are very unsatisfactory the committee conducting the campaign decided to organize courses for mothers; these courses are well attended. In the capital, Tirana, courses for the training of midwives were organized, and some women were sent to France for post-graduate study. —*Maternità ed Infanzia*, Rome, Sept., 1932.

NEW PASTEURIZING PROCESS ILLEGAL IN ILLINOIS

A NEW development in pasteurizing equipment which is a modification of the old " flash " method has been the subject of research and study by various persons and organizations during the past few years.

This new method is known as " short time " pasteurization and consists of heating milk to a temperature of 162° F., and holding at that temperature for a period of 15 seconds.

The milk committee of the A.P.H.A. reported at the Montreal convention on studies and experiments with new type short time pasteurizers. The conclusion that may be drawn from this report is that " short time " pasteurization will produce safe milk from a public health standpoint. Commercially it is said to have many advantages over the holding method now in use.

Some Illinois pasteurization plant owners are showing interest in the " short time " pasteurization method. However, Illinois law requires that milk or milk products be heated to a temperature of not less than 142° F., and held at such temperature for not less than 30 minutes. To permit the use of " short time " pasteurization in Illinois, it will be necessary to amend the existing law.

The New York State Department of Health and Pennsylvania Board of Health have approved " short time " pasteurization. Texas State Department of Health has indicated that " short time " pasteurization will be permitted in that state.—*Illinois Health Messenger*, Nov. 15, 1932.

PERSONALS

C. O. SAPPINGTON, M.D., DR.P.H., F.A.P.H.A., of Chicago, is now conducting a new service as consultant on problems of Medicine and Hygiene in Industry.

JOHN A. LAPP was elected Director of the National Rehabilitation Association at their convention in Chicago October 12.

DR. WILLIAM WALTER CORT, professor of helminthology and head of the department, School of Hygiene and Public Health, Johns Hopkins University, delivered the annual address of the Alpha Alpha chapter of Alpha Epsilon Delta, University of Alabama, on November 16, 1932. His subject was " The Hookworm Problem in the United States." Following the lecture, honorary membership in Alpha Epsilon Delta was conferred upon Dr. Cort.

DEATH

MORRIS KNOWLES, F.A.P.H.A., Sanitary Engineer of Morris Knowles, Inc., Pittsburgh, Pa., died November 8.

[Medical Library]

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